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THE  
DENTAL COSMOS:

A

MONTHLY RECORD OF DENTAL SCIENCE.

*Devoted to the Interests of the Profession.*

EDITED BY

JAMES W. WHITE, M.D., D.D.S.

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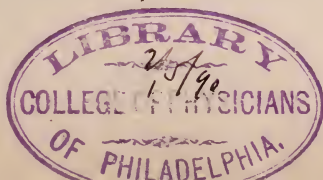
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# THE DENTAL COSMOS.

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VOL. XXXI. PHILADELPHIA, JANUARY, 1889.

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No. 1.

## ORIGINAL COMMUNICATIONS.

### ETIOLOGY OF IRREGULARITIES OF THE JAWS AND TEETH.\*

BY EUGENE S. TALBOT, M.D., D.D.S., CHICAGO, ILL.

#### VII.

#### THE ORIGIN AND DEVELOPMENT OF THE V- AND SADDLE-SHAPED ARCHES, AND KINDRED IRREGULARITIES OF THE TEETH.

THE profession generally has been influenced in its opinions regarding the correlation existing between the intellectually weak, and the deformities known as the saddle- and V-shaped arches, by the published opinions of several well-informed medical men. Drs. Langdon Down and Ireland first called attention to the fact that these deformities frequently existed among the idiotic and feeble-minded in the different institutions with which they had been for many years connected. The journals of to-day rarely publish an illustrated article on the subject which does not contain the stereotyped pinched or contracted jaw, associated with idiocy. By personal examination of hundreds of idiots and feeble-minded throughout this country I have become convinced that these irregularities do not *per se* indicate idiocy. Only a small percentage of them could be classed as having contracted arches, while fully fifty per cent. displayed large, well-formed jaws.

The microcephalic and congenital idiots contribute largely to make up the class exhibiting narrow arches. Among the deaf, dumb, and blind, a much larger percentage of these deformities was found than among the feeble-minded. But I do not wish to convey the impression that these deformities are confined to these classes of unfortunates, for they may be frequently observed in the mouths of the most intelligent and healthy. For instance, a young man of

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twenty-three years, the youngest of ten children, is the possessor of a very high and markedly V-shaped arch, while all the other brothers and sisters have perfect dental arches. This young man has an unusually bright intellect, brighter indeed than any of the others. Another case is that of a railroad president who has a thoroughly trained mind and is naturally a very able man. His upper jaw is of a well-defined V-shape, while the lower jaw has a marked saddle-shaped arch. Many similar cases could be cited, but the above demonstrate the proposition that these deformities are not characteristics of idiocy alone. The cause of the V- and saddle-shaped arches has been attributed to thumb-sucking. Dr. Ballard,\* of London, says, "All persons whose jaws are arched so prominently forward have sucked their thumbs when infants." He further stated that thumb-sucking preceded and was a forerunner of idiocy.

As is well known, the habit of thumb-sucking usually antedates the eruption of the first set of teeth, and is almost invariably overcome before the eruption of the permanent teeth, and the permanent set is rarely affected by this habit. Nor is it confined to feeble-minded children. Upon examining the jaws it will be found that the deformity caused by sucking the thumb is not properly classed among the saddle- or V-shaped arches, but has distinct and marked characteristics of its own. We find that these deformities cannot be accounted for by particular lesions or conditions of the body, and we shall have to look for other causes. It appears upon investigation that these deformities were never seen in the early races or in clannish tribes of the present time. Nor can we find arrested development of the jaws among such tribes. But these conditions are repeatedly seen among mixed races and individuals inhabiting the older parts of new countries. The connection between these deformities and the mixing of races having been thus established, we will look into the progress of their development, and see if we can trace a relationship between them. These deformities are never seen in connection with the first set of teeth, nor are they seen in the second set until after the eruption of the first permanent molars and incisors. They are produced in connection with the development of the cuspid and bicuspid teeth. The idea which formerly prevailed that these deformities were associated only with high arches has been found incorrect, for they are almost as frequently met with in the flat or normal arch as in the high arch. In a collection of thirty-five V- and semi-V-shaped arches, twenty-two of them are high, thirteen are low. In forty-seven saddle-shaped models, twenty-six are high, twenty-one low arches.

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\* Medico-Chirurgical Proceedings, vol. iii.

A few of each are due to local causes, and cannot be classed with either. High arches assist materially in the production of these deformities. This may be owing to the fact that when the arch is high the alveolar process is thin and deep, and is more easily influenced in one direction or another by the movements of the roots of the teeth. We shall find on examining a jaw with a V- or saddle-shaped arch that a lack of harmony exists between the teeth and maxilla. The jaw is so small that the teeth are crowded in every direction during their development.

The teeth do not change in size; they are the same normally to-day that they were three thousand years ago. The maxillary bones, on the contrary, are gradually diminishing in size. The V- and saddle-shaped arches each have their peculiar characteristics, and both possess some points in common. They are both produced by local as well as constitutional causes. Both are caused by an inharmonious development of teeth and jaws, and in both the teeth are crowded. In the V-shaped arch the alveolar process and incisor teeth are forced forward and project. In the saddle-shaped arch the alveolar process and incisor teeth stand perpendicularly. The V-shaped arch is always associated with the superior maxilla, and is never seen in the inferior maxilla when the jaws occlude normally. The saddle-shaped arch may be associated with either jaw. The semi-saddle- and V-shaped arches are more common than the fully-deformed jaw, and these deformities, as has been stated, are the results of local causes. In the mouths of idiots, deaf, dumb, and blind as well as in healthy individuals, fully twice as many V-shaped as saddle-shaped deformities have been observed. This wide difference in numbers can be readily understood when the causes producing them are known.

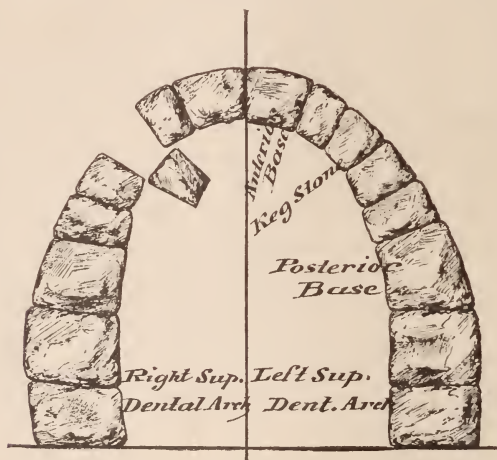
The manner of these formations is as varied as the peculiarities themselves.

It may be well at the outset to state that the only structures involved in the formation of these deformities are the jaws and the alveolar processes on the one hand, and the teeth upon the other. The jaws and processes are soft and yielding, while the teeth are composed of hard, unyielding substance. The process therefore adapts itself to the conformation of the teeth. We are taught that the teeth of the superior or inferior maxilla constitute a dental arch, and that the first permanent molars perform the function of keys to the arch. After years of thorough investigation I find that the jaws and teeth, like the lateral halves of the body, develop independently of each other, both possessing their own peculiar characteristics as regards irregularities of the teeth. In order to simplify the classification of irregularities of the teeth I shall call the

lateral halves of the jaws, which are separated by the median line, the right and left inferior and the right and left superior dental arches. While these terms as applied to the lateral halves of the maxillary bones are not strictly scientific from an architectural point of view, yet practically (as will be seen) they answer the purposes for which they are employed.

The manner of the formation of the V-shaped arch and kindred deformities may be compared to the construction of an arch of stone. The changes which take place in the movement of the teeth are very similar to those which may occur in a stone arch of faulty construction. Figs. 1, 2, 3 are intended to represent six varieties of irregularities of the teeth. Each lateral arch is viewed as containing stones corresponding in number and size with the teeth of a nor-

FIG. 1.

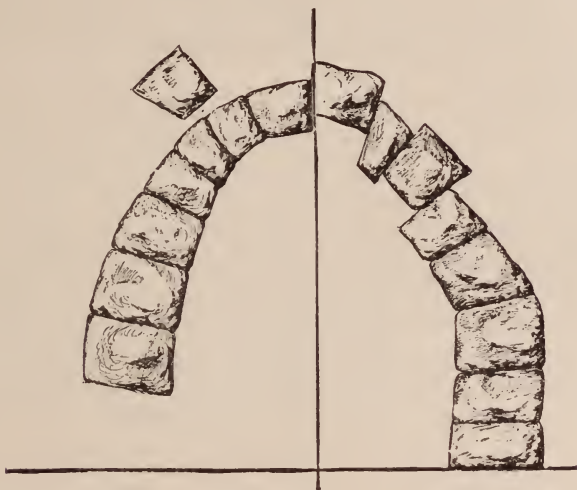


mal upper denture. Fig. 1 represents two arches; the left superior arch is perfect. The first stone is marked "posterior base," and corresponds to the first permanent molar. The second stone is the "anterior base;" it corresponds to the central incisor. The next stone is located upon the anterior base, and corresponds to the lateral incisor. The succeeding stones are laid upon the posterior base, and represent the first and second bicuspid. The stone corresponding to the first bicuspid is usually in position first, but sometimes the stone corresponding to the second bicuspid is placed first. To complete the arch it is necessary to place the "key-stone" in position—the cuspid tooth. If the stones have proper proportions and the measurements are correct, the key-stone will fit into place and the arch will be complete. We shall find, on examining the foundations, two more stones, which correspond to the second and third molars.

These stones, with the base and the stones above the base, make a strong abutment.

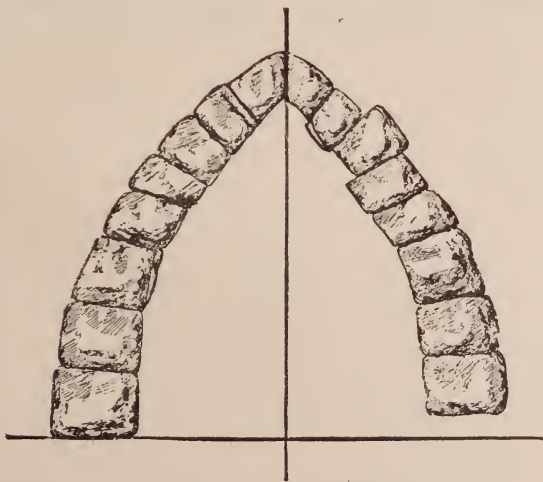
In Fig. 1, the right superior arch shows the diameter of the stones

FIG. 2.



to be either too small for the curve of the arch, or that the bases were set too far apart for the curve of the arch. This results in a greater space for the key-stone than is required, and not finding support it drops through towards the center line.

FIG. 3.



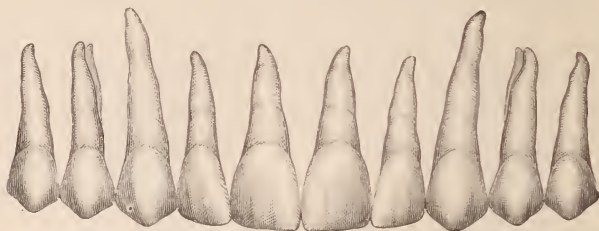
In Fig. 2 the right superior arch shows that the posterior base and the foundation stones have been brought forward to such an extent that when the other stones are placed in position, the space



intended for the key-stone is entirely closed and the key-stone remains outside the arch. The left superior arch appears as though the key-stone were too heavy for the arch, and its weight has carried the smaller stones with it. The posterior base with its foundation stones being the strongest, resists the force; the anterior base being weak and without support, bulges out, and in this way a semi-V-shaped arch is produced.

Fig. 3 illustrates the V-shaped arch. The right superior arch shows that the key-stone has gradually carried the arch inward; the posterior base is in its proper position, the anterior base has been carried forward, and all the stones are in line. The key-stone in the left superior arch has produced the same result as upon the opposite side, excepting that the posterior base and the foundation stones were placed too far forward, leaving insufficient space for the key-stone. The teeth, however, do not bear the same relation to each other upon their approximal surfaces that the stones of the arches do. The stones of an arch have broad, flat surfaces, while the teeth touch merely upon the points of rounded surfaces.

FIG. 4.



The ten anterior teeth which are involved in the construction of the V-shaped and kindred irregularities are illustrated in Fig. 4, in which the positions of the roots and crowns, and their mutual relations, are approximately shown. As will be observed, the teeth are all wedge-shaped, the bases being located near the cutting- and grinding-edges and the apices at the ends of the roots. These are nearly round and conical, the points of antagonism being near or quite at the cutting- or grinding-edges. These points must be kept in mind, as they constitute the fulcrum of the levers, which, when force is applied to the teeth, cause them to rotate and move out of position, thus producing a greater variety of deformities than it is possible to demonstrate upon the stone arch.

As has been previously mentioned, these irregularities are not observed until after the eruption of the second set of teeth. We shall therefore first consider the first permanent molars. These teeth are the largest, strongest, and possess the largest roots of any of the teeth. They are located posteriorly to the temporary set.

Owing to their position and to the fact that they have long, large roots, their apices are directed backwards, and, in a majority of cases, the distance from the apex of one root to that of another is greater than at the neck, which fact indicates that they are firmly fixed in their alveoli. The alveolar process is wide at those points; these teeth therefore would naturally be designated as the posterior bases of the lateral arches.

The next teeth which make their appearance are the central incisors. These are situated in the extreme anterior alveolar process on either side of the median line, and the process is quite thin at these points. These teeth will be called the anterior bases of the lateral arches. The next to make their appearance are the lateral incisors, which take positions at the distal surfaces of the central incisors. The roots of these teeth are not as large nor as long as the roots of the centrals, therefore they are not as firmly fixed in the alveoli. Each lateral tooth, however, is supported by the central, and represents the second stone upon the anterior base. The teeth which next appear are the first bicuspid. Immediately following are the second bicuspid, which represent the second and third stones upon the posterior bases. The arches are then complete, except the key-stones—the cuspid teeth. These cannot be omitted, for they bind and hold the teeth together and give beauty and shape to the arches. The follicles of these teeth are originally situated outside of and above the crown and roots of the teeth already in the arch, which results in a larger circle; and because these teeth have long, powerful roots, unusual power and leverage is given them. For this reason they are directed downward and inward, their crowns being so located that the lips assist greatly in aiding the downward movement of these teeth. The downward and inward movement of the cuspid is similar to the lowering of the key-stone in an arch; it continues to move downward until it meets with an obstruction, which may be confined to the upper jaw and include the teeth anterior and posterior to the cuspid. If the teeth in position are in harmony with the jaw, the cuspid will descend into their proper places and, touching the teeth on each side, lock the arches and hold the teeth in proper position.

Let us examine the arches with their bony encasements, and ascertain what the bases are resting upon, the relative strength and support of each base, and the relative strength of the anterior and posterior columns. In the posterior parts of the mouth the alveolar process is very thick, and the base—the first permanent molar—is large, having three roots in the upper jaw and two in the lower, curved and so arranged in the alveolar process as to preclude its going backward. We also find other teeth of nearly equal strength



posterior to the first permanent molars. Anterior to the base—the first permanent molar—we find the first and second bicuspid; these teeth are all firmly imbedded and situated in the long axes of the alveolar process, forming together a very firm base. The anterior column of the arch consists of but two teeth, while the posterior column has five. The anterior teeth possess single roots, and are situated crosswise in a very thin alveolar process, thus demonstrating the comparative weakness of the anterior arch. In some instances the space may be too large in the superior arch, and the key-stone or cuspid tooth continue in its downward course till it engages with the teeth in the lower jaw. It not infrequently happens that the cuspid will meet with no resistance in its downward course, or that the tooth may point inside of the arch before it commences its downward journey. In such cases it may either erupt or become imbedded in the roof of the mouth. Such a case is illustrated in

FIG. 5.



Fig. 5.\* Both cuspids have passed into the roof of the mouth and have carried the anterior teeth and alveolar process forward, producing a pinched condition of the bicuspid region and forming a decided V-shaped arch. This deformity is similar to the right superior dental arch of Fig. 1. The jaw is sometimes entirely too small for the teeth. This condition may be a natural one, or the posterior teeth may move forward and fill the space intended for the cuspid. Owing to the position and inclination of the cuspid teeth, the tendency is (especially if the bicuspids have crowded forward) to take a forward movement in their downward course. Where this is the case, the pressure of the cuspid against the root or the crown of the lateral causes it to be carried inward. The crown and root of the lateral being so much smaller than those of the cuspid, it cannot resist the pressure, and is carried into the roof of the

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\* This illustration is from a drawing of the dental arch in a skull now in the possession of Dr. Haskins, of Chicago.

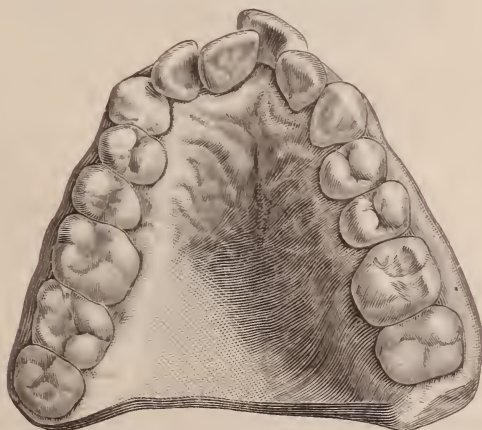
mouth; such a case is illustrated in Fig. 6, and resembles the left superior dental arch, Fig. 2. The left dental arch also indicates a further complication of the irregularity by a forward movement of the posterior column, carrying the lateral incisor to the median line.

FIG. 6.



The incisor roots are conical and nearly round. They are situated in a long, thin alveolar process, the base of one arch (the central incisor) resting upon the base (the central incisor) of the opposite arch. The anterior column cannot resist an unrestrained force like that of the posterior column. The teeth being all in position, the arch is ready

FIG. 7.



to receive the key-stone, the cuspid tooth. It moves slowly down until it meets a resistance so great that the anterior dental arch and alveolar process are not strong enough to support it; the result is that the anterior column and foundation (alveolar process) of the

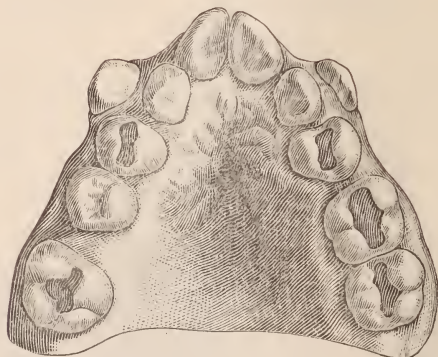
arch give way. The point of the central incisor turns forward, and the semi-V-shaped arch is formed, Fig. 7, corresponding to the left superior dental arch, Fig. 2. If the right and left cuspids come into place uniformly, both anterior columns are forced forward, producing the V-shaped arch, Fig. 8, which resembles the right and left dental arch, Fig. 3. If, for any reason, they should not develop in harmony,

FIG. 8.



one central incisor will project beyond the other. If the roof of the mouth is high and the alveolar process thin and deep, the pinched condition in the cuspid region is more likely to occur. If partial space is left in the arch for the cuspid, then the forward movement of the incisor teeth and alveolar process will allow this tooth to come

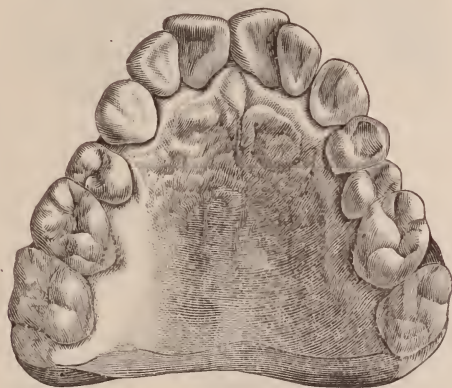
FIG. 9.



into line with the other teeth. If, on the contrary, the posterior teeth have moved forward, so that the space is decreased, then the cuspid, if it possesses sufficient power, will carry the alveolar process forward and inward, but itself will remain outside the arch. Such a case is illustrated in the right and left dental arches, Fig. 9, which resembles the right superior dental arch, Fig. 2.

The manner of the formation of the typical V- and semi-V-shaped jaws and alveolar process has now been demonstrated. Kindred irregularities of the teeth and their relations to each other depend entirely upon the shapes of the crowns, the points of approximal antagonism, the undeveloped jaws, and the direction of the disturbing forces. No two cases of irregularities are exactly alike, all being modified by local influences. This explains a remark which I have made before, viz: that irregularities of the teeth are not inherited. Asymmetry and arrested development of the jaws may be transmitted, but the teeth are creatures of circumstances. They develop and move into position independently. They are crowded by the forward pressure of the molar teeth, modified by asymmetry of the maxillary bones and the inward pressure of the cuspids. These

FIG. 10.



forces account for the location of irregularities in the anterior part of the mouth. The following are illustrations of a few of my models showing the peculiarities of arrangement of the teeth in V- and semi-V-shaped arches.

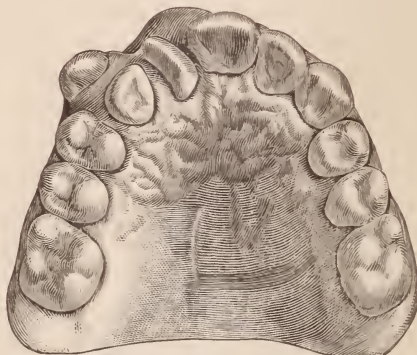
Fig. 10 shows a very common form of irregularity of the central incisors. In the development of the central and lateral incisors, the mesial points of the laterals passed posterior to the distal points of the centrals. The anterior movement of the teeth posterior to the laterals was so great as to not only rotate the centrals, but also carry the alveolar process slightly forward. Under such circumstances the forward movement of the right and left dental arches does not cease until the mesial surfaces of the crowns come in contact with the centrals throughout and the lateral pressure is equalized against the anterior bases—the central incisors.

Fig. 11 illustrates a singular irregularity in the right superior dental arch. A supernumerary tooth is located in the external plate



of the alveolar process, directly in front of the proper position for the right central incisor. It has pushed the incisor to the right. The construction of the left dental arch is perfect, but it will be observed that the anterior base—the central incisor—from lack of antagonism with the right anterior base has been forced past the

FIG. 11.



median line by the pressure of the posterior column. The posterior column upon the right dental arch has moved forward quite a distance. The movement of the central incisor has carried the lateral to the position which should be occupied by the cuspid tooth. By this movement the space in the arch is nearly closed. The cuspid tooth being outside the arch has carried the lateral incisor

FIG 12.



and alveolar process inwards; thus with the aid of the supernumerary the central has turned around one-fourth and inclines inward. If the mesial surface of the central incisor had turned outward, a typical semi-V-shaped arch would have been produced.

Fig. 12 illustrates two semi-V-shaped arches. The teeth in the

left dental arch are nearly on a straight line. The teeth in the right dental arch are situated upon a slight curve. In this arch the cuspid is in position, while upon the left arch it is missing. The posterior teeth have moved forward and filled the space intended for the cuspid. It is still located in the alveolar process, and the force produced by the inward pressure of the cuspid is so great that the central and lateral incisors have been carried forward and the teeth and alveolar process have produced the straight line. The lateral pressure of the teeth prevents their being carried farther inward. The lack of proper antagonism of the central incisors has allowed the cuspid to force the incisor and alveolar process forward until the basilar ridge of the right central antagonizes with the mesial surface of the left central. This, in a measure, checks the progress of the cuspid inward and holds the arch on a slight curve.

FIG 13

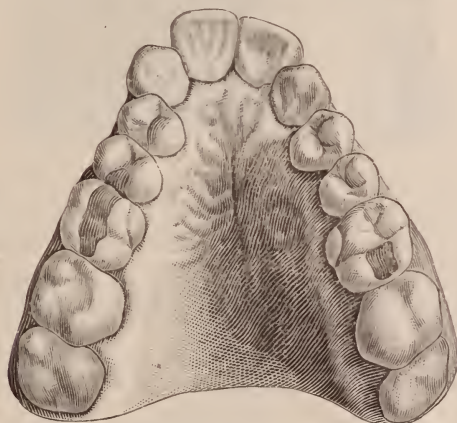
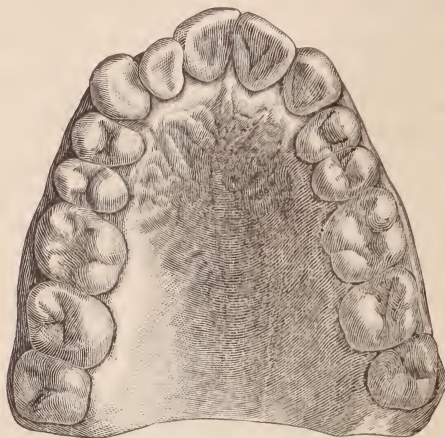


Fig. 13 also shows two semi-V-shaped arches, complete, except that the central incisors are in a nearly normal position,—i.e., the mesial surfaces are turned but slightly forward. It will be observed that the lateral incisors are missing. The cuspids have moved forward, and have not only filled the space, but have carried the alveolar process with them, giving the jaw a lengthened appearance. Had the laterals been in place, their mesial surfaces would have touched the distal edges of the centrals in such a manner as to have rotated the centrals into the V-shaped form. The antagonism of the surface of the cuspids and the uniform pressure of the posterior columns in each lateral dental arch have caused the forward movement of the centrals without rotation. The absence of the lateral incisors and the forward movement of the alveolar process have caused the cuspids and bicuspid to be carried inward, thus producing straight lines instead of curved.



Fig. 14 shows the left dental arch to be of the V-shaped variety. The lateral incisor is missing and the cuspid has taken its place. The mesial and distal surfaces of the central antagonize inside of the mesial surface of the left cuspid and right central incisor.

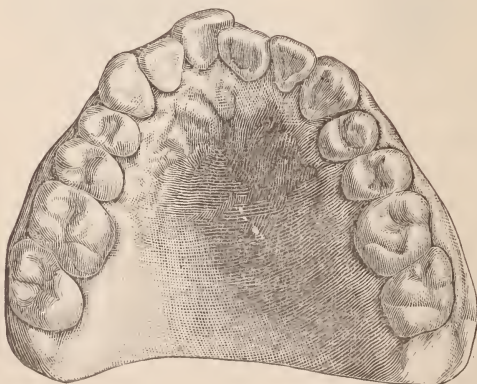
FIG. 14.



Owing to the peculiar arrangement of the teeth, the forward movement of the posterior column has carried the central incisor inward, thus preventing the formation of a perfect semi-V-shaped arch.

The right dental arch, while not perfect, yet at first sight would strike the observer as fairly normal. Upon a closer inspection, how-

FIG. 15.



ever, it will be noticed that the cuspid and posterior column (or teeth) have moved forward, carrying the lateral slightly inward, and the mesial surface of the central outward; while all the teeth in that arch are in position to form a perfect semi-V-shaped arch, yet

there is not sufficient force exerted by the cuspid and posterior teeth to carry the incisors forward. Taken as a whole, a fair contour of the dental arches is preserved.

Fig. 15 shows the left dental arch in a nearly normal arrangement. The mesial surface of the central incisor has been crowded inside of the right central, and, owing to the close antagonism of all the teeth in the arch, its contour has been well preserved. On the other hand the mesial surface of the central incisor in the right dental arch has been carried forward by improper antagonism, and the force of the cuspid has carried the alveolar process inward.

By studying these cuts closely, it is easy to trace a general resemblance in all, and it is evident that the force of the cuspid tooth, and the lack of space, are the causes of the mischief. While these two causes, in a general way, produce these irregularities, yet it is plain to every one that no two are exactly alike. This fact is also true in regard to irregularities in thirty-eight other models in my possession.

(To be continued.)

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## THE INCIPIENCY OF DENTAL CARIES.

BY LOUIS OTTOFY, D.D.S., CHICAGO, ILL.

(Read before the Joint Meeting of the American and Southern Dental Associations, Louisville, Ky.,  
August 30, 1888.)

DENTAL caries is in many respects one of the most peculiar diseases by which any part of the human body is liable to be affected. While many vague theories exist regarding its cause and prevalence, —climate, nationality, race, age, social condition, and other circumstances are supposed to influence it,—it is indeed remarkable that dentistry should have progressed as it has, with so little known of the facts concerning the general condition of the organs to which the members of our profession devote their time. Nearly all the information accessible is based on unreliable observation. The office of the dentist is not the proper place to observe and form opinions as to the prevalence of caries; neither are the poor-houses, hospitals, infirmaries, etc., proper places to secure reliable statistical information as to caries and other diseases or conditions of the mouth. For neither the dentist's office, nor the public institution established for specific purposes, contains or is visited by a number or class of people who are representative. They frequent or are inmates of these places for specific objects. Those who, man for man, and woman for woman, will fill our places in the next generation, are the ones to be examined, and these in civilized countries, as a general rule, are found in the public schools. In view of the

necessity of undertaking the work of examining and tabulating the condition of the teeth of school-children, and in order to facilitate the investigation, the inquiries below are submitted.

"As there is a wide-spread belief among the medical as well as the dental profession that the teeth of man degenerate in proportion as he advances from a savage to a civilized condition, and as the literature of our own profession, in treating of the causes of the decay of the teeth, invariably attributes it to physical degeneracy consequent upon man's artificial mode of living, it is certainly time that those who rely upon this hypothesis as an explanation of disease be called upon to furnish not only opinions and inferences, but proofs of a conclusive character of their assertions.

"1st. Are more people subject to nervous diseases now than formerly? And if so, do such people suffer more from diseases of the teeth than those who are not so afflicted?

"Man in a barbarous or uncivilized condition acts upon impulse, whereas the civilized man reflects before he acts, for it is only by the exercise of this reflective quality in man that he becomes civilized, and the shortness and misery of savage life must be taken into account in making up statistics on this subject.

"2d. Are diseases of the teeth more common now than formerly?

"Ancient and modern history, poetry and old works on medicine, record diseases of the teeth, as well as the supplying of their loss by artificial means. Pre-historic skulls should be examined and tabulated; and to be of scientific value not a few, but many, should be so treated, for if decay of the teeth is found even in one skull out of one hundred, the fact would be established that the teeth of pre-historic man *were subject to decay*, and further examination would establish the degree.

"3d. Are the majority of human teeth in the present age in a good or bad condition?

"We need statistics on this subject, for by far the largest number of people who visit a dental office are the class who have bad teeth. They are driven there by necessity, and it takes a great advance in civilization for persons to consult a dentist in regard to the condition of their own or their children's teeth before they suffer pain or inconvenience; so that statistics in regard to the condition of the human teeth based upon what may be seen in a dental office are of little value. Yet it is a fact that the greater part of what has been said on the increasing degeneracy of the human teeth has been compiled from the general impressions received by the dentist in the practice of his profession through a series of years; and by careful observation and an increasing practice he is forced to the conclusion that human teeth are degenerating. I am well aware



that a successful practice, coupled with close observation, is entitled to respectful consideration as such, but for scientific purposes touching the degeneracy of the human teeth, an office practice is too limited a field of observation to be of value.

"4th. Are the teeth of people living in the United States worse, or more disposed to decay, than the teeth of people living in Europe?

"It is a common belief that the American's teeth are worse than the European's; and some of our profession, with an industry little short of tyranny, have done much by their writings to foster that belief. They have taken no pains to formulate tables, but have collected their statistics from the babblings of homesick servant-girls, and the vaporings of recent immigrants who are hardly naturalized or acclimated before they are afflicted with an 'American toothache.' "\*"

In other countries some attention has been paid to this work. Mr. Fisher, of Dundee, Scotland, has conducted some examinations recently at a naval school. Of the four hundred pupils examined at that institution from ten to sixteen years of age, eighty had sound teeth, while over three hundred were in need of dental services. As the children selected for these institutions are supposed to be strong, healthy, and well developed, and they were selected for these physical qualities, what might not the condition be in others less developed? In an "Industrial School for Girls," among eighty-five of the inmates, ranging from seven to sixteen years in age, sixteen had sound teeth, while in sixty cases the teeth were more or less carious.

Magitot, Tomes, and others in Europe, Hitchcock, Black, Patrick, and others in this country have also made examinations and tabulated the results of their investigations. While all these tables are of much value and furnish a great deal of information, they fall short of what is desired. They only show the relative proportion which prevails among carious teeth; that is, how many incisors, and how many molars, etc., would be found in a carious condition if people were examined at random. An attempt has been made by Magitot to determine the ages at which certain teeth are most affected, but the difficulty has been that the numbers from which the averages were made were not sufficient to cover the attempted period from eruption to the age of seventy. His observations have led him to say,—

"We notice that, generally speaking, caries affects the upper more frequently than the lower teeth: the figures giving 6004 upper against 3996 lower, or about 3 to 2. Yet we find that this propor-

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\* Dr. John J. R. Patrick, Trans. Ill. State Dent. Soc., 1882, pp. 151, 152.

tion, true for the teeth as a class, is not so for the first and second molars, in which caries is more frequent in the lower jaw. Comparing the opposite sides of the same jaw, we do not find a difference sufficiently marked to be taken into consideration, and may assert that caries is equally frequent on the two opposite sides of the same jaw. The two sexes present a difference in the predisposition to caries which, although slight, is worth noting; thus, in a total of 1000 cases in adults we have found 583 in the women and 417 in the man, placing the sexes from this point of view in an approximate ratio of 3 to 2.

"The age of the patients and the period of the greatest frequency of caries ought likewise to be determined. Considered as a whole we see that caries in the deciduous period affects the upper jaw by preference; for in a total of 1000 cases, 543 are found for this against 457 for the under jaw.

"The tooth most frequently attacked is the first molar; then follow successively the second molar, the lateral incisor, the central incisor, and lastly, the cuspid. For the three last the malady is much more common in the upper jaw, while for the two molars the relation is inverse, dispositions which recall those of the permanent teeth.

"As regards the age at which, in the child, the malady appears, without having applied to this the graphic tracings, we are yet able to give some indications: thus it is at about the third or fourth year that we first observe caries, and its frequency increases from this moment in a regularly progressive manner, up to the age of twelve, the average period of the loss of the last deciduous tooth.

"The French law exempts from military service, first, when there is a loss or caries of the incisors or cuspids of one of the jaws; second, when there is a loss, caries, or bad condition of the majority or of a large number of the other teeth."\*

Hence in France much attention has been given to the examination of the teeth of conscripts, and while no definite reason is assigned it is well known from which of the eighty-six departments of France those come who possess the best teeth, and Magitot gives a table showing such location.

That much importance is attached to the fact that the teeth should be examined in various countries systematically, may be seen from the variation between Magitot's and Hitchcock's tables. The different teeth are not equally subject to the attacks of caries; in the first place, the upper are more frequently attacked than the lower, according to Dr. Magitot (*op. cit.*, p. 48), in the proportion of

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\* Magitot's Treatise on Dental Caries, Chandler.

3 to 2; while the yet more comprehensive tables of Dr. Hitchcock give the ratio of 1.9 to 1 (or very nearly two to one), the first and second lower molars, however, suffering even more frequently than the corresponding teeth. There does not appear to be any noteworthy difference between the two sides of the mouth in their relative liability to caries.

Tables drawn up by various observers correspond in their main features with one another. "Those drawn up by Dr. Hitchcock differ in some particulars of interest. Thus in his tables, the carious first molars do not show the great preponderance in numbers over all other teeth which is exemplified in most other tables; and as his tables embrace fillings as well as extractions, this cannot be attributed to the early attention given by Americans to their teeth."\*

"Dr. Magitot's second table of 2000 cases combined with the first of 10,000, analyzed, shows 4971 carious lower teeth as against 7029 upper teeth, or, excluding the incisors and cuspids of both jaws, in consideration of the well-marked immunity of lower incisors and cuspids, 4951 carious upper molars and bicuspid, as against 4611 lower molars and bicuspid. Of these, lower molars furnish us with 3616, as against 2902 upper molars, so that the protective effect which helps lower teeth is not efficacious at the back of the mouth, indeed becomes less efficacious as we go backwards from the incisors; this would seem to confirm the idea that it is the secretion of the submaxillary glands that is the protective agency.

"The female sex is distinctly more liable to dental caries than the male, though in what proportion the caries occurs remains uncertain, for the want of sufficient data; so that different authors arrive at widely different estimates. The patient's age, likewise, markedly influences the disease; thus, if it has not occurred before the age of five-and-twenty, there is a strong probability of immunity till about the fiftieth year, when, coincidentally with other manifestations of bodily decline, the teeth again become liable to be extensively attacked with caries."†

Parreidt has the following on this subject: "According to my statistical examinations, which extend to over 13,000 decayed teeth, the caries may be arranged in the following group:

	Per cent.
First inferior molar . . . . .	20.6
Second inferior molar . . . . .	14.1
First superior molar . . . . .	12.4
Second superior molar . . . . .	8.4
Third inferior molar . . . . .	6.7

\* Tomes's Dental Surgery. Third edition, 1887.

† Ibid.

	Per cent.
First superior bicuspid . . . . .	6.3
Second superior incisor . . . . .	5.6
First superior incisor . . . . .	5.2
Second superior bicuspid . . . . .	5.1
Third superior molar . . . . .	4.3
Superior cuspid . . . . .	3.8
Second inferior bicuspid . . . . .	3.2
First inferior bicuspid . . . . .	2.8
Inferior cuspid . . . . .	0.6
Inferior lateral incisor . . . . .	0.5
Inferior central incisor . . . . .	0.4

"Aside from this I have ascertained that one hundred carious teeth on an average are composed of twenty-six incisors and cuspids, twenty-eight bicuspids, and forty-six molars. Of the incisors and cuspids, on an average ninety-eight per cent. decay on the approximal, and only four per cent. on the incisive, lingual, and labial surfaces. The bicuspids also decay most frequently (ninety-two per cent.) on the approximal surfaces, and only the molars decay most frequently (seventy per cent.) on the masticating surfaces, while on the approximal surfaces the percentage is twenty-eight, and on the labial and lingual two per cent."\*

But these inquiries should be pushed further. Not only should we understand the relative percentage of decay, but its prevalence at each age and what if any influences bear upon increasing or decreasing it. Then, also, the proportion of the sound to the unsound teeth should be determined, so that an approximate conclusion may be arrived at as to the relative condition of the teeth at various ages.

This paper is presented at this time not so much for the value, if any, which may attach to it because of its statistical nature, as for the purpose of again calling the attention of the profession to the work which should be done, and to enlist the services of others. The Section on Physiology and Etiology of this Association has had 5000 blanks (see accompanying chart) printed, and the members of the Association should each contribute his share, to present at the meeting next year the report of 4000 or 5000 examinations. This would cover about 100,000 teeth; a sufficient number from which to draw entirely reliable data. In the work which I have done the information sought has not been as extensive as I have desired. The cases on which I report show the density of the enamel, classed as hard, medium, and soft; the presence or absence of salivary calculus at the various ages, as also the healthy or diseased condition of the soft tissues, the regularity or corresponding irregularity of the teeth, the prevalence of caries at each age and in each

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\* Parreidt's Compendium of Dentistry. Translated by Louis Ottofy, 1889.



[illegible]



particular tooth, right and left side, and the response to a test of the mixed saliva.

The inquiry could be extended by ascertaining the nationality of the child and its parents and the influence of the same on caries, also the occupation of parents, or social condition, and hence secure the information in reference to the supposed deleterious influence of high living upon tooth-degeneracy; the color of hair and eyes, the features and occlusion and their bearing upon the quality of tooth-substance or their liability to destruction, as also the influence of general health.

Careful tests of the parotid, submaxillary, and sublingual saliva, as each issues from its duct or ducts, could at the same time be made.

Inquiry as to the influence of hygienic means, the use of brushes, dentifrices, etc., upon the condition and cleanliness of the teeth, and the relation of the color of caries to the rapidity of its progress, could thus be observed; also to what extent salvation of the teeth is prevalent, the relative influence of the extraction of permanent teeth on those remaining (as for instance the first molar), and the change of position of the adjoining teeth; the cause of stains upon the teeth, the early deposition of salivary calculus and the causes leading thereto; grooves and pits in the enamel and their causes, and the question of the earlier eruption of teeth on the one side than on the other. These and many more vague questions can be solved in this way only. But it requires time to do it, and many should engage in the work in many parts of the country. About ten minutes are necessary to make the examination of one child's mouth, and to properly record it on a blank. Thus if one person would devote one hour a day throughout the school year, Saturday, Sunday, holidays, and vacations excepted, scarcely one thousand children could be examined.

The records thus obtained would grow more valuable, and could be used in the future by re-examining the same children for purposes of comparison, thus noting the improvement or degeneracy of the teeth and the causes leading thereto. In this connection the examination of skulls now in the various museums of this country may be recommended again, and steps ought to be taken by this Association to have the work accomplished, that the valuable information within such easy reach, in regard to the condition of the teeth in past ages and among various tribes and nations, may be noted and tabulated.

The number of children I wish to report on at this meeting is 623, consisting nearly half and half of males (317) and females (306), and ranging in age from five to fifteen years. Of this number only forty-eight had perfectly sound sets of teeth, which would

indicate that the teeth of only something over seven and a half per cent. are sound before the age of fifteen. Of the males about ten per cent. (thirty-two in number) and of the females slightly over five per cent. (sixteen in number) had perfectly sound sets of teeth. The number of teeth examined, their cavities classified and tabulated, is as follows:

*Sound teeth.*

Temporary	3225						
Permanent		7600	.	.	.	.	10,825

*Carious teeth.*

Temporary	1875						
Permanent		1944	.	.	.	.	3,819
		<hr/>					<hr/>
		5100					14,644

Some of the children were examined in the public school at Grand Forks, Dakota, others at Lebanon, Illinois, and at Chicago, Illinois. The table shows over 34 per cent. carious and less than 66 per cent. sound. Of the 1944 permanent carious teeth, only 53 had been attended to by filling or otherwise, and about 1 per cent. of the carious permanent teeth had been extracted. The number of teeth equally divided would give each child 17.37 sound, and 6.22 carious teeth.

The mixed saliva in each instance was tested with a reliable quality of litmus paper, but no attempt was made at these examinations to distinguish the different kinds of saliva as they issue from their respective channels. About two-thirds of the examinations were made before meals and one-third after meals. No marked difference was observed as to time of making observation. The chemical reaction was as follows:

TABLE SHOWING REACTION OF MIXED SALIVA AT DIFFERENT AGES.

At 5 years of age 75 per cent. neutral, 25 per cent. acid, and 0 per cent. alkaline.

6	"	"	61	"	"	39	"	"	0	"	"
7	"	"	61	"	"	39	"	"	0	"	"
8	"	"	84	"	"	14	"	"	2	"	"
9	"	"	67	"	"	31	"	"	2	"	"
10	"	"	77	"	"	16	"	"	7	"	"
11	"	"	73	"	"	27	"	"	0	"	"
12	"	"	69	"	"	30	"	"	1	"	"
13	"	"	74	"	"	22	"	"	4	"	"
14	"	"	90	"	"	10	"	"	0	"	"
15	"	"	65	"	"	29	"	"	6	"	"

The average of the chemical reaction between the ages of five and fifteen years was 72.36 per cent. neutral, 25.64 per cent. acid, and 2 per cent. alkaline. This result will be found to vary only minutely in even the largest number of observations. My former



observation that in cases of neutral saliva, caries is less frequent than in cases of either acid or alkaline saliva has been confirmed by these examinations. The acidity or alkalinity of the saliva may be due to the presence of caries. The density of the enamel was found to vary considerably at different ages. The average as shown by actual examination during the ages from five to fifteen years is 44.90 per cent. hard, 45.50 per cent. medium, and 9.60 per cent. soft, which seems to prove that the density of the enamel is somewhat below the average during the eruptive period.

TABLE SHOWING DENSITY OF ENAMEL AT DIFFERENT AGES.

Age.	Hard.	Medium.	Soft.
5 . . .	37½ per cent.	62½ per cent.	0 per cent.
6 . . .	33½ "	56½ "	10 "
7 . . .	23½ "	60 "	16½ "
8 . . .	38 "	50 "	12 "
9 . . .	35 "	47 "	18 "
10 . . .	45 "	49 "	6 "
11 . . .	43¾ "	46¾ "	9½ "
12 . . .	51½ "	39½ "	9 "
13 . . .	62 "	26 "	12 "
14 . . .	70 "	23 "	7 "
15 . . .	53 "	41 "	6 "

The presence of salivary calculus amounted to 9.64 per cent. The greatest number of cases were found between the eleventh and thirteenth years, and in almost all of the cases where calculus was present the saliva was in an acid condition.

TABLE SHOWING PRESENCE OF SALIVARY CALCULUS AT DIFFERENT AGES.

Age.	Presence of Calculus.	Absence of Calculus.
5 . . .	14 per cent.	86 per cent.
6 . . .	4 "	96 "
7 . . .	3 "	97 "
8 . . .	2 "	98 "
9 . . .	6 "	94 "
10 . . .	8 "	92 "
11 . . .	17 "	83 "
12 . . .	16 "	84 "
13 . . .	20 "	80 "
14 . . .	10 "	90 "
15 . . .	6 "	94 "

The diseases of the soft tissues were confined to irritation and inflammation of the gums, mostly caused by the presence of calculus. The average of diseased cases was 4.9 per cent., and disease was found to be most prevalent at the age of eleven, at which time fourteen per cent. of the children were affected.



TABLE SHOWING PRESENCE OF DISEASES OF THE SOFT TISSUES AT DIFFERENT AGES.

Age.	Diseased Condition.	Healthy Condition.
5 . . . . .	0 per cent.	100 per cent.
6 . . . . .	2 "	98 "
7 . . . . .	2 "	98 "
8 . . . . .	1 "	99 "
9 . . . . .	2 "	98 "
10 . . . . .	5 "	95 "
11 . . . . .	14 "	86 "
12 . . . . .	9 "	91 "
13 . . . . .	1 "	99 "
14 . . . . .	8 "	92 "
15 . . . . .	10 "	90 "

The irregularity of the teeth was most marked at the eighth year of age, at which time of life 43 per cent. of the cases were found to be irregular. The average irregularity amounted to 24.13 per cent.

TABLE GIVING PERCENTAGE OF IRREGULARITY OF THE TEETH.

Age.	Irregular.	Regular.
5 . . . . .	0 per cent.	100 per cent.
6 . . . . .	9 "	91 "
7 . . . . .	27½ "	72½ "
8 . . . . .	43 "	57 "
9 . . . . .	14 "	86 "
10 . . . . .	31½ "	68½ "
11 . . . . .	32½ "	67½ "
12 . . . . .	25 "	75 "
13 . . . . .	20 "	80 "
14 . . . . .	35 "	65 "
15 . . . . .	28 "	72 "

Among these children there was only one marked case of hereditary syphilis,—that is, with the specific markings of the teeth described by Hutchinson. There were two cases of what is known as chemical abrasion, one a boy of fifteen whose four inferior incisors were thus affected, and the other a girl of twelve whose superior right central incisor was affected. In two instances (boys ten years old) the inferior left temporary lateral incisor and cuspid were found united by fusion of their crowns; while in another instance, a boy of the same age, the upper right temporary lateral incisor was fused to a supernumerary; and in a boy twelve years of age, the permanent upper right lateral incisor was also found fused with a supernumerary. In addition to these cases of abnormality, I observed two supernumeraries immediately posterior to the upper permanent central incisors, one in a boy of nine, and the other in a girl of eight.

Of the 5100 temporary teeth examined, the following were the percentages of sound and carious teeth:

	Sound.	Carious.
Inferior central incisors . . . .	99.07	.03
Inferior lateral incisors . . . .	99.01	.09
Superior central incisors . . . .	98.68	1.32
Superior lateral incisors . . . .	98.58	1.42
Inferior cuspids . . . . .	98.01	1.99
Superior cuspids . . . . .	97.22	2.78
Inferior first molars . . . . .	93.48	6.52
Superior first molars . . . . .	93.28	6.72
Inferior second molars . . . . .	92.20	7.80
Superior second molars . . . . .	90.23	9.77

Of the 9544 permanent teeth examined, the following was the percentage of sound and carious teeth:

	Sound.	Carious.
Inferior cuspids . . . . .	99.99	.01
Inferior central incisors . . . . .	99.96	.04
Inferior lateral incisors . . . . .	99.95	.05
Superior cuspids . . . . .	99.95	.05
Inferior first bicuspid . . . . .	99.90	.10
Superior second bicuspid . . . . .	99.72	.28
Inferior second bicuspid . . . . .	99.70	.30
Superior first bicuspid . . . . .	99.62	.38
Superior lateral incisors . . . . .	99.45	.55
Superior central incisors . . . . .	99.15	.85
Superior second molars . . . . .	98.75	1.25
Inferior second molars . . . . .	98.43	1.57
Superior first molars . . . . .	92.80	7.20
Inferior first molars . . . . .	92.30	7.70

No marked difference seems to exist between the two sides of the jaw, so far as liability to caries is concerned. According to the following table, showing the condition of 9544 permanent teeth, there is but a very slight difference:

CONDITION OF 9544 PERMANENT TEETH.

	SOUND.		CARIOUS.	
	Right.	Left.	Right.	Left.
Upper . . . . .	1895	1954	504	507
Lower . . . . .	1916	1835	448	485
Right side, sound . . . . .	3811			
Right side, carious . . . . .			952	
Left side, sound . . . . .		3789		
Left side, carious . . . . .				992

By the following table we can observe the greater prevalence of decay among females than among males at the different ages:

TABLE SHOWING THE PREVALENCE OF CARIES AT THE DIFFERENT AGES DURING THE ERUPTIVE PERIOD OF THE TEETH.

Age.	Per cent. in Males.	Per cent. in Females.	Per cent. in Both.
5 . . . . .	16	37½	29
6 . . . . .	34	25½	29¾
7 . . . . .	32½	50½	41½
8 . . . . .	34½	33¾	34
9 . . . . .	34	44¾	39½
10 . . . . .	31	31	31
11 . . . . .	24½	24¾	24½
12 . . . . .	24	24½	24¼
13 . . . . .	21¾	27½	24¾
14 . . . . .	22½	30	26
15 . . . . .	25	30½	27½

It will thus be seen that when computing both the temporary and permanent teeth together, as well as separately, caries is more prevalent among girls than among boys: amounting in the former to 37½ per cent. at five years, being never less than 24 per cent., and sometimes as high as 50 per cent.; while in boys the maximum at any one age was 34 per cent., and the minimum 16 per cent. At all ages during the eruptive period caries was more prevalent, on an average, among females than males by 5 per cent. The proportionate ratio is about the same during the eleven years of life covered by these statistics. The total average at all ages among these children was 27½ per cent. in males, 32¾ per cent. in females, and 30 per cent. in both. This therefore seems to indicate that at least thirty out of every hundred teeth are carious before the age of fifteen years is attained, and sometimes over 20 per cent. of those of the permanent ones which are erupted at these ages are already affected. By the computations made from these examinations it was shown that these children average twenty teeth each; about two-thirds (fourteen) are permanent, and five of the fourteen have been attacked by caries.

### IMPLANTATION OF TEETH.

BY RODRIGUES OTTOLENGUI, M.D.S., NEW YORK, N. Y.

In the November (1888) number of the DENTAL COSMOS is published a paper by Dr. H. A. Smith, containing tabulated implantation data the deductions from which are clearly incorrect and therefore misleading. Gentlemen who have operated less than ten times are credited with one hundred per cent. of success, while those who have operated over thirty times have a lower rating simply because

one or two teeth have been lost. One gentleman is given credit for ninety-nine per cent. of success. To obtain such a figure he must have implanted at least one hundred teeth and lost one, whereas at the time the report was made he had implanted less than forty. But the main error is in crediting "*success*" to anyone. "*Success*" in the implanting of teeth means, if it means anything, permanency, and as yet the time has been too limited for any man to claim "*success*."

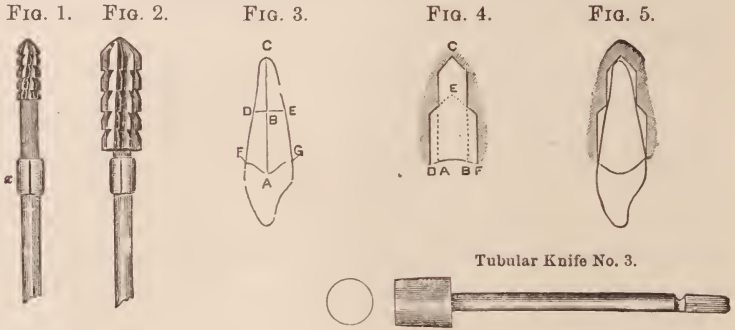
We may, however, do everything which intelligence and experience suggest to further the chances of ultimate success with this operation, which, when once proven to be reasonably permanent, will take position as the greatest advance in dental science that has been made within the last fifty years. Therefore it becomes the duty of those performing the operation, as yet in the dark, to use every precaution, since from the records of their cases the decision for or against the operation will be made.

With reference to a few of the objections to be noted in relation to the suitability of a tooth for implantation, I would suggest that all teeth should be discarded which show that they have been the subjects of disease. A close examination with a lens will often demonstrate incipient exostosis, or absorption, in teeth which seem excellent specimens. Never use a tooth with a calcified pulp or an abraded or eroded crown, or when there had been recession of the gum producing softening about the tooth-neck. Discard teeth which have dried and cracked, even though the crack be most minute. In a word, use as far as possible teeth which come into your possession within a week of extraction, and which are or appear to be healthy. I believe that to these extreme precautions I owe the fact that out of thirty cases I have had but one to cause suppuration during the healing process, and that I have not as yet had a loss. As to methods: After twenty-five operations I concluded that the instruments supplied by dealers are inadequate and unsuitable. I experimented with several original shapes, and have at last produced a set which not only simplifies the operation by making it more exact, but by experiment in my own mouth I know that the pain is reduced to the minimum, less indeed than is caused by an engine bur on sensitive dentine.

Figs. 1 and 2 represent the smallest and largest of a set of five instruments. There are nine leaves to each reamer, divided each into five teeth for lateral cutting; and of the nine but three reach the apex of the end cone, thus allowing a rapid forward drilling into the bone. In operating two instruments are needed for each case. Having selected a tooth, a reamer is chosen which has a diameter



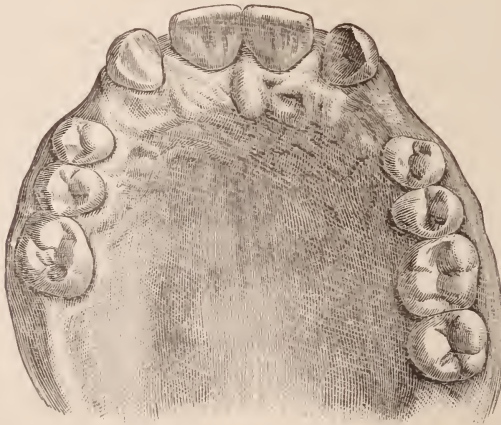
equal to that of the root at its thinnest upper third, *d, e* (Fig. 3). The depth to which it must be carried, *a, c*, is next measured by setting the collar *x* (Figs. 1 and 2). The second reamer must have a diameter equal to that at the neck of the tooth, *f, g*, and must only enter the socket as far as *b*. In this the sliding collar will not



serve, but the measure of the length of the line *a, b*, Fig. 3, may be made by observing how many of the teeth must enter the bone.

Having selected the reamers, a circular incision is made in the gum with a tubular knife (No. 3), and the tissue dissected away, exposing the bone. Then the smaller reamer is used, entering the

FIG. 6, A.



full depth indicated by the collar, Fig. 4, *a, c*. This is followed by the second reamer, and the socket enlarged (Fig. 4, *d, e*). The relation of socket to root is shown in Fig. 5. For elliptical sockets the reamers must be slanted and the sockets cut laterally.

Having drilled the socket to the full depth with the first instru-

ment, it is a certainty if the tooth cannot be properly placed that it binds *laterally*, and *reaming* is needed, not *drilling*. All who have performed the operation will recognize the value of this knowledge. I append a description of some noteworthy cases.

Fig. 6, A, represents the mouth of a young lady. The laterals

FIG. 6, B.

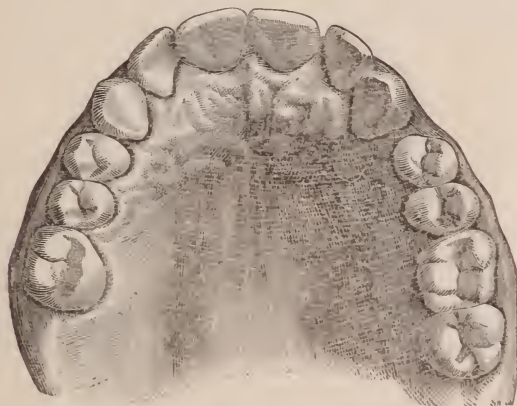


FIG. 7, C.

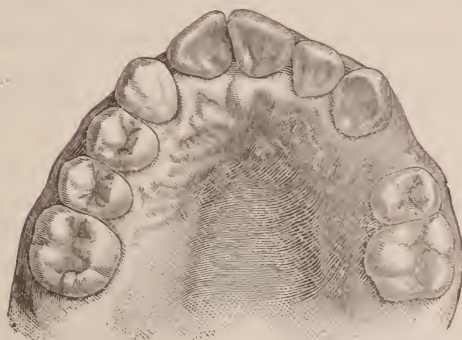
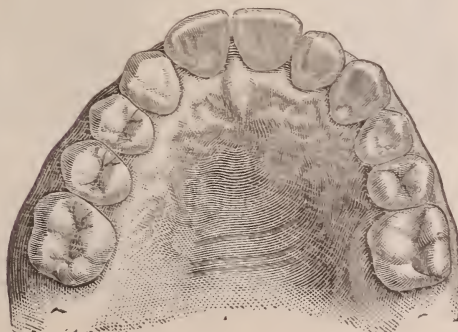


FIG. 7, D.



were missing, the cuspids had come forward, and the bite was so close that regulation was impracticable, and at best would have necessitated a plate for the laterals. The cuspids were removed, their sockets brought forward, and selected laterals implanted. The cuspids were afterward placed in new sockets, and the result is as

FIG. 8, E.



shown in Fig. 6, B. The space between the left central and lateral was the result of the patient's removing the splint and absenting herself until too late to alter the position of the tooth. Its misplacement, however, is not of any moment.

Fig. 7, C, represents a young lady's mouth. Efforts to rotate the

FIG. 8, F.



centrals had resulted in the death of the pulps, and in partial absorption of the roots. They were removed, their sockets enlarged and deepened, and two beautiful teeth, mates, placed in position. A bicuspid was afterward implanted where a plate had been worn for years. The result is seen in Fig. 7, D.

Fig. 8, E, represents the mouth of Dr. Andrews. Dr. Younger implanted a tooth in this space. It was subsequently lost, and made the subject of microscopic examination, and of reports opposing implantation. The tooth now in place was inserted by my present method in six minutes. To give it a greater chance of remaining undisturbed, it is held in position by being united to the adjoining teeth. A wire was laid in a groove in the cutting-edges, and the anchoring fillings made of gold and platinum foil, with the result shown in Fig. 8, F.

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## PROCEEDINGS OF DENTAL SOCIETIES.

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### JOINT MEETING OF THE AMERICAN AND SOUTHERN DENTAL ASSOCIATIONS.

(Continued from page 899, vol. xxx.)

#### FOURTH DAY—*Morning Session* (Continued).

THE Joint Committee on Dental Education, Literature, and Nomenclature was called, and Dr. J. Taft read a brief report, submitting the papers to be read.

Dr. Louis Ottofy, Chicago, read the regular section report, of which an abstract follows: The section notes with pride the advances made by many of the schools in increasing their standards of requirements and in the improved tone of their methods of teaching. At no time in the past were so many good schools in operation as now. The number is twenty-nine, located as follows: California, 1; Georgia, 1; Illinois, 4; Indiana, 1; Iowa, 1; Kentucky, 1; Maryland, 2; Massachusetts, 2; Michigan, 1; Minnesota, 1; Missouri, 3; New York, 1; Ohio, 1; Pennsylvania, 3; Tennessee, 3; District of Columbia, 3. There were matriculated for the session 1887-8, 1937 students, an increase of 299. At the commencements 746 students were graduated, an increase of 138. Attendance on two full courses of lectures prior to graduation is now required by all the schools. Eleven of the schools demand three years' study and three of them attendance on three full courses of lectures. It is hoped that the others will accede to the demand for an increase of the time. Several societies have passed resolutions to that effect. It is very desirable that the length of the sessions be made uniform. At present it varies from thirty-nine to twenty weeks, and considerable opposition has been encountered on the part of the short-term schools, for whom the claim was made that the hours devoted to teaching in them were equal to those in the nine-months' course of



others. Many of the schools having a regular session of four or six months are in reality, by means of the spring and fall sessions, open nine months, but attendance on the spring and fall sessions is optional. The section would recommend that for the present the course of study be increased to seven months, from September 1 to March 30, and that a short session follow, extending to May 30, attendance on the last to be compulsory with juniors and optional with seniors. The section would also heartily recommend all the dental colleges in the United States to become members of the Faculties Association, for the purpose of mutually aiding the development of the educational system. In the last report of this section, in calling attention to the advantages of dental colleges connected with well-established medical colleges or universities, it was said that the union of dental colleges with sectarian institutions is deleterious to dental education. Of the twenty-nine colleges seven are independent, four are connected with medical colleges only, and eighteen are independent departments (or departments in conjunction with medical departments) of universities; of these, however, only eleven are connected with institutions calculated to make them more useful. The traffic in dental degrees is completely eradicated, and the granting of degrees *honoris causa* occurs seldom, while degrees *in absentia* are now never granted. The secretary of the section has endeavored to obtain facts and figures relating to alleged irregularities, but could learn nothing positive from reliable foreign sources, and he is confident that no irregularities have occurred for several years. If any unjust stigma now rests on the dental institutions of this country, it is proper that it should be removed. The section recommends that it be empowered to transmit through the United States Bureau of Education to the Minister of Education in Germany and to Prince Bismarck, the head of the German Civil Medical System, a list of the dental colleges, with such additional information relating to the manner of educating dentists, laws governing dental practice, etc., as it may deem proper. It is also recommended that the colleges in their announcements for the session of 1889-90 give space to a requirement from candidates for both admission and graduation that they "shall subscribe to Article 2, Section 3, of the Code of Ethics of the American Dental Association." The establishment of post-graduate courses has attracted attention, and they have been given in England at the National Dental College and the Dental Hospital, both of London, and in Germany at the University of Leipzig during the past summer. As shown by these the conception of a post-graduate course in foreign lands, where it consists of demonstrations and lectures on dental topics,—similar to our clinics and society meetings,—differs from the idea of such a course

here, where it would in fact be a scientific and literary education, comprising Physics, Electricity, Metallurgy, Microscopy, Zoology, Botany, Anatomy, Embryology, Histology, etc. Of dental education in foreign countries it may be said that Germany, France, and Great Britain are well supplied with dental institutions; Austria requires a medical degree; Switzerland, Russia, Australia, Peru, and Mexico have one school each, and lectures on dentistry are delivered in some of the other universities in these countries, as also in Japan, Brazil, Chile, Norway, Sweden, Spain, and Italy.

In accordance with the resolution adopted at the last meeting of the American Dental Association looking to the introduction of elementary instruction in dental histology, anatomy, and hygiene into the public schools, the secretary had sent out one hundred and twenty letters to superintendents of instruction in cities of over 18,000 population. Replies had been received from thirty-two, representing a school population of 600,000. From a careful canvass of the subject, the section is of opinion that it is entirely feasible to introduce dental teaching in at least twenty large cities, and that no difficulty will be met with in the smaller towns and country schools. The plan proposed involves the publication under the auspices of this association of a suitable book or pamphlet, to be supplied to boards of education adopting the study of dental physiology and hygiene.

There also exists a necessity for the general education of the masses, which is being met to some extent by individuals and local societies. The section hopes to present in proper form at some future time the matter of the establishment of a national dental academy, museum, and library, as also the appointment of dentists to the army and navy and to the various eleemosynary institutions of the land.

The report chronicles the appearance of a new dental journal, *El Arte Dental*, in Mexico, and gives a list of more than fifty books and pamphlets published during the year.

In the department of dental nomenclature nothing of importance has occurred. The section recommends the appointment of a council of twelve, whose object it shall be to secure the appointment of similar councils in Great Britain, France, Germany, Austria, Spain, Italy, and other countries, to formulate and establish a system of nomenclature which shall be universal and scientifically proper.

Dr. W. H. Atkinson, New York, read a paper entitled "The Basis for Teaching Nomenclature and Terminology," in which he argued that the manner and degree of endowment of functional power is the only proper basis for classification, and hence that the

study of final entities and the media in which they subsist is necessary to discriminate the changes which produce the more obvious mass-motions pertaining to the individuals and the masses of bodies under examination. The key to the subject is a knowledge of the metamorphoses of primal elements in combinations and separations which are known as atoms. This is the A, B, C of function, and when exhaustively studied gives the means of comprehending healthy and unhealthy modes of expression which are nominated disease in the text-books.

Dr. Taft read a paper on Dental Education by Dr. B. Holly Smith, of Baltimore. An abstract follows: ' The assignment of dentistry to its proper position among professions, and the decision of the proper elements of a dental education, are correlative questions; the one acting upon and shaping the other. According to the medium through which one sees dentistry will appear his opinion of the requisites and essentials to training in that calling and fitting for it. Elevation of the educational standard, increased severity in tests of acquirements, extension of course, and a higher grade of attainments for dental students and practitioners, seem to be uppermost in the minds of all earnest thinkers and writers on the subject. It is beginning to be seen that dentistry cannot be satisfied with the fact that a few of her sons are great in their work and attainments; but can require nothing less than that a high standard of education be set for every one who desires to practice the profession, which is now too easy of access; that it is too easy for imperfectly trained young men to be turned loose on the world, bearing but dishonoring the name of dentist. Such are the ideas of many whose labors in their chosen calling have made them distinguished. Laying aside all questions having their origin in any false pride with regard to the relative position of dentistry as a profession, they have looked upon it as an agent for the accomplishment of a certain and definitely specified work, and they have become convinced that the character, extent, and scope of that work justify them in claiming from those who aspire to enter dentistry abundant evidence of natural ability, patient study, and extended preparation. As to the method to be pursued to secure this, schemes of fusion and alliance with medical colleges have been suggested; the establishment of a chair of dentistry in a medical college; on the one hand the complete subordination of dentistry to general medicine, on the other a smattering of medical education,—all have been argued for, and all or nearly all have been tried and are being tried.

To the unbiased the following propositions are submitted as not inconsistent, and as capable of being assented to by all: 1st. Dentistry as a profession founded on a knowledge of scientific truth,



a successful application of scientific principles, and requiring, moreover, in the highest degree, hand and eye training, should have prominent among the elements of its preparatory education a training in scientific studies and methods and the cultivation of manual dexterity. 2d. Dentistry as a specialty of medicine requires that its practitioners lay the foundation of their special knowledge in a knowledge of the general principles of medicine. 3d. Dentistry as a specialty demands a special as well as a general knowledge, not theoretical only, but practical.

It will not be questioned that there should be a considerable and thorough preparatory education before entering upon the subject of dentistry proper, nor that a course of preparatory study, demonstrably best adapted to a general training and discipline of the mental powers and at the same time best fitted to the special work the student is to pursue, must be the best possible preparatory education.

With regard to educating the hand and eye of the youth who purposes to study dentistry, as an element of his preliminary course, it may be remarked that among prominent educators such a training is looked upon as essential. The success of men in almost every walk of life, especially of the surgeon or dentist, may depend upon niceties of sight and touch. Much of this delicacy and accuracy of sense is acquired in the training intended to fit him directly for his profession, but how much better if begun when the faculty of its acquisition is vastly greater and the members to be trained vastly more adaptive. It has been too often and too generally attempted to unite in the same short course the preparatory studies, and the direct preparation for practice; or rather the preparatory part of the course has been omitted, and the attempt has been made to create theoretical physicians and skillful operators out of absolutely crude material. It is a duty to create a sentiment, and a strong sentiment, for a preparatory education of the right character, and to endeavor to show students the necessity for such education.

The writer is sure that the second proposition voices the views of all the leading minds of the profession,—that as a specialty of medicine, dentistry requires that its practitioners lay the foundation of their special knowledge in a knowledge of the general principles of medicine. This view began to be held soon after the establishment of schools, and it has been reiterated with ever-increasing emphasis of conviction and truth, until medicine itself has heard and recognized it. That dentistry is a specialty of medicine could not long escape the observation of those who studied and practiced it, and a medical education was but the natural outcome or se-



quence of that idea. It was on the method of accomplishing this much-wished-for end that such a variety of opinions has been held. Whatever may be the harmonious adjustment of the various plans for this necessary extension of the dentist's education, the writer cannot see that the necessity for dental colleges has ceased to exist. For, although many of the reasons which led to their establishment have lost some of their cogency, it must be remembered that it was because of the establishment that the reasons have ceased, and although medicine recognizes dentistry as one of its specialties, the part of the dental college and its training in enforcing that recognition must not be forgotten.

Elevate the standard of professional education as much as you may,—broaden the foundation, increase the severity of the tests which show a proper study and culture,—but you cannot, by any general study, do away with the necessity for a thorough special education. It is the law of a profession or science as far-reaching and comprehensive as medicine, to differentiate into specialties, and the idea that depreciation of the specialty adds to the worth and dignity of the parent profession must be dismissed. It is the fidelity and patience of special investigation and study that must extend the knowledge, multiply the resources, and increase the power of the general science. On the other hand, the care of the specialty and its peculiar functional development cannot be safely intrusted to the general practitioner. One man cannot know all of such a profession as medicine. Even dentistry, specialty as it is, is beginning to have its specialties. This development and multiplication of specialties cannot be hindered, because it comes of a knowledge which, though it may seem contracted in the individual instance, is nevertheless an addition to the vast aggregate. Neither can one in the nature of things master it all; so that there remains the choice between a lamentable failure in attempting too much and the success which awaits concentrated, intelligent effort. In fact, the necessity for education in the general principles of medicine is born of the requisites of dentistry, and to be met for the advantage of dentistry,—to bring to its ranks better-trained men. To whom should the improving and perfecting of agencies for the accomplishment of the work of dentistry be intrusted if not to dentists,—those who have their deepest interest in it?

Fortunately, an instrumentality is already organized whose effect on dentistry, in guarding it against too easy access by unfit and imperfectly educated men and in elevating and extending the course of study required, should be most salutary, the National Association of Dental Faculties. We need the strength that is in union, that all may insist on the cardinal points which all may unite in calling neces-

sary: 1st. The creation of a sentiment in favor of a special preparatory course looking towards the study of dentistry. 2d. The elevation of the standard of education in dental colleges and a corresponding extension of the term. 3d. More careful supervision and inspection of the entrance of men into the profession who do not come into it through the colleges. It would appear to be in the power of the associated faculties to accomplish what is desired in this direction. To unite upon a plan which all can follow should not be difficult to men earnestly bent on the same object, and willing to sacrifice in unimportant details that the great central purpose may be accomplished. Let the degree conferred by any faculty of that association be the essential prerequisite for a reputable entry into dentistry, and they have a power and influence for good. They can insist on proper training, extension of course, and higher grade of requirements, uninfluenced by the fact that some other institution can make dentists more quickly and more cheaply. When the attainment of the degree means thorough preparation and earnest study, it will no longer be reflected upon as the "badge of partial culture."

This seems the most practical solution of the problem. The entrance of men into the profession by other avenues than a regular and reputable college course requires careful consideration. It is no depreciation of the vigor and worth of the pioneers to say that the present state of dentistry cannot be satisfied with anything short of actual evidence of careful preparation on the part of its practitioners.

The State boards of examiners have had an important duty to perform, and they have done it well; but contrast the evidence that a student has gone through with a well-chosen and thorough course, with the fact that a man has answered a majority of the questions asked by a dental examiner, and let anyone decide, other things being equal, which is the better test of ability and proficiency. Examinations are but imperfect tests at best, and they cannot always be given at best. The examiner stands more in the light of an officer of the law to protect the community from criminal ignorance and stupidity than of one whose object is to elevate and advance the profession of which he is a member, so that the protection afforded the profession is merely an incident. Why not put it into the power of the National Association of Dental Faculties to demand their diplomas as a better and more satisfactory test? Do you say it would work hardship to the individual? So it would; but think of the benefit to the profession and the public.

## UNION CONVENTION OF THE FIFTH, SIXTH, SEVENTH, AND EIGHTH DISTRICT DENTAL SOCIETIES OF THE STATE OF NEW YORK.

(Continued from page 921, vol. xxx.)

FIRST DAY—*Evening Session.*

THE convention was called to order by Dr. C. T. Howard, Rochester, president of the Seventh District Dental Society.

Under "Incidents of Office Practice," Dr. J. H. Beebe, Rochester, related the following case: Some time since a patient presented herself with the lower sixth-year molar on the left side abraded on the coronal surface. The occlusion was such that an unusually large cusp on the upper tooth shut into the cavity when the jaws were closed. Here was a case that in his judgment needed crowning. The patient was very nervous, and the teeth being extremely sensitive she objected to having them ground away, especially the cusp of the upper tooth. Finally he persuaded her to allow him to take off a portion of the inner wall of the cavity. A band of gold was then fitted to the abraded tooth, which was nearly straight, the neck being nearly as large as the crown, so that but little grinding was necessary. (Bear in mind that there was no striking up of band or tooth-crown.) A cap or cover of 24-karat gold, No. 36 gauge, was made for the band, and its edges allowed to extend over the edges of the band, to which it was soldered. It was then with a ball burnisher burnished down into the cavity in the tooth; removed, and this depression partly filled with wax, and replaced upon the tooth, and the upper teeth closed down upon it. The wax, being soft, would thus take an impression of the upper tooth. The cap and band were then removed, invested in sand and plaster, leaving a portion of the wax exposed. A little depression was made in the investment near the exposed portion, into which the gold solder was placed. Having heated the whole till the wax was burned out, and putting in plenty of borax ground with water on a slate, the heat was increased till the solder was melted. Then the investment was tipped, allowing the solder to flow in and take the place of the wax, thus *casting the grinding-surface to the articulation*. The result was so satisfactory that he has since made several other crowns in the same manner. Though it may be slower than the usual way, one gets a wonderful occluding surface.

Dr. George W. Melotte, Ithaca, thought the method was certainly ingenious, and it was one which he had never thought of, and in such a case as had been described it would help out very nicely. It had been so well described that anyone could do it, and he for one was glad to have seen it.

The subject was passed.



Dr. John Van Duyn, Syracuse, addressed the convention on the subject of the "Abnormity of the Dentist's Eye." He said the subject of the dentist's eye had occurred to him when invited to address the convention on the back of two experiences which he had had. Some twenty years ago one of his molars was affected with caries, and he went to a dentist who cleaned out the cavity and made an observation of a fact of which he (the speaker) was ignorant. Another dentist disagreed with the first. The difference between them was because one could not see what the other could,—a small spot in one portion of the cavity. After considerable discussion they came to an agreement, and the tooth was saved for ten years. Some three or four years since a young man who was intending to study dentistry came to him to have his eyes examined, because he failed to see at a certain point. Careful testing showed that one-half his vision was gone, a fact which determined him to give up the idea of becoming a dentist. These two facts had determined the subject of his remarks.

The eye is the most important instrument which the dentist has. In some callings the hearing or other faculties are more useful, but in the practice of dentistry the eye is all-important. In proportion as the eye of the dentist is defective, his usefulness is lessened. Some persons have trouble with their eyes from birth, others have difficulties which are acquired at various periods of their lives, at thirty, forty, or fifty years. He would not go into a list of the troubles of the eye, but would only state a few of them. These are connected with refraction,—with the way the rays of light are disposed of after they enter the eye. [Dr. Van Duyn here drew upon the blackboard a diagram of the normal eye, which he explained.] When a ray of light enters the normal eye, what becomes of it? Those rays which strike the center go straight through; if they strike above or below the center they are refracted—he would not speak of the laws of refraction—so that all meet at a point upon the retina, which is called the focus. Such an eye is called emmetropic. When the light-rays are refracted in this way the eye sees, and vision is perfect. In an eye in which the antero-posterior portion is shortened, the focus comes behind the retina, and it is characterized by indistinct sight, the hypermetropic eye. There is another condition, just the opposite of this, in which the antero-posterior portion of the eye is too long. Here the light-rays focus before they reach the retina. This is the near-sighted, the myopic eye. There is still another condition, of which Dr. Marshall can tell you something, the irregular eye, the astigmatic eye. In this the meridian in one eye is normal, or hypermetropic, or myopic, and in the other one of the other conditions is found. Any two of them may be combined. If it is a



regular astigmatism—where one meridian is normal—the difficulty can be perfectly corrected by properly made glasses; but when it is irregular,—when neither eye is normal,—the correction can be only approximate. In this eye the focus is not a point but a line.

The correction of all these difficulties of vision is of course by means of glasses. When the eye has its focus too far back, the lines of the rays of light must be made to converge before they enter the eye; so we put on a convex glass. For the myopic eye, the focus must be thrown back; hence concave glasses are used to cause the rays to diverge, so that when they enter the eye they will be carried farther back than they would be without the glasses.

The hypermetropic and the astigmatic eye are congenital; the myopic is or it is not congenital. In the former case it is known; in the latter it may go on for years before the fact is discovered. Whether it is acquired or congenital the way to find it out is by comparison with normal sight. If it is found that the lens of the eye is imperfect so that one does not see, it must be changed. The sailor's eye, the keen vision of which is so often quoted, is not so good as the landsman's. The sailor will announce that the ship is approaching land long before the landsman aboard observes any sign of it. But it is not superior sight on the part of the sailor. He sees a mistiness, which his experience teaches him means that the land is near. With the hypermetropic eye there is not always a necessity for glasses, as when the condition exists in the young eye, because at five, ten, fifteen, or twenty years the lens is so soft in the lamellæ and the ciliary muscles so strong that a greater curve is given to the lens when looking at near objects, so that the defect is not noticeable, although the act of seeing in such cases is accompanied by muscular effort. As the person grows older, the lens becomes harder and is less easily curved, so that at the age of thirty to forty or forty-five years the muscular effort required begins to be felt as a strain and glasses are required. Every eye becomes hypermetropic at the age of seventy or eighty years; that is, it loses the power of curving the lens. This curving of the lens is what is called "accommodation." When we look at an object at a distance and then at one nearer, the lens is curved more for the nearer object.

Applying these general principles to the eye of the dentist, it is readily seen that a fissure in the enamel so fine as is often found will require strain of the eyes to see it; also, how important for the discovery upon the surface of the smallest points of the beginning of caries is perfect vision. Then, too, how is the approach of disease as disclosed by the shadows, by the depth of color, which we get by transmitted or reflected light, to be seen without it? All these things are only appreciated by the finest vision. Two luminous

points cannot be distinguished by the normal eye except they are separated by an angle of sixty seconds; within that distance they seem as one. A few eyes can distinguish the difference at fifty seconds' separation, while others are so coarse that they require an interval of eighty or ninety seconds. In order to know, one must see, and persons who have not a sufficiently sensitive retina cannot know because they cannot see. Accuracy of vision depends upon the sensitiveness of the retina.

To go back to the emmetropic eye: let a man use the naked eye till he is forty years old in a pursuit which requires constant close application of sight, as in the practice of dentistry, and he will begin to feel the effects of fatigue on the eye. Sometimes the disturbance is in the eye itself, sometimes it is shown by headaches, and even by general weariness of the whole system. He is not sick, but he tires easily. This is due to the fact that the ciliary muscle is not able to do its work as formerly, and the strain is reflected. Just as soon as this occurs the retina loses sensitiveness, and just so soon as the sensitiveness is lost we do not see. So that it becomes necessary for a man intending to adopt the practice of dentistry to recognize that he must have perfect eyesight; and it follows as a corollary that no one should enter the profession without first having a competent examination of his eyes. If he has astigmatism of a kind which cannot be corrected by the use of glasses, he should refrain from entering the profession. Again, if, having become a dentist, he finds, after reaching the age of thirty years, that his eyes become fatigued, he should periodically repair to the proper authority for examination. By such a course only can he avoid the troubles which are to be attributed to over-use of the eyes.

Dr. John S. Marshall, Chicago. Prof. Van Duyn never said a truer word than when he declared that the eye was the best instrument of the dentist. The dentist is usually very sensitive about his eyes. How many of them put on glasses willingly? Dr. Marshall presumed that he was born with astigmatism. He was troubled with fatigue of the eye and general weariness all through his student life, and for twelve years after entering upon the practice of dentistry. He was completely broken down, and finally it was suggested that there might be trouble with his eyes. Prof. Van Duyn made an examination which disclosed the existence of horizontal astigmatism, and he prescribed the very glasses which the speaker has on to-day. There are probably many here to-day who suffer from these troubles of the eye. They cannot get near enough to the patient's mouth to see the work properly, and when the day's work is done they go to their homes feeling worn out. A gentleman near

Chicago thinks that dentists should use different glasses from those usually prescribed. He thinks they should wear prismatic glasses, because, as he says, the dentist has to get so close to his work that the normal eye cannot see without injury, and the effort causes a slight convergent squint. If they would get prismatic glasses the eyes would look straight out. Dr. Black wears them with much satisfaction. If dentists would lay their pride aside and wear glasses whenever they are needed, they would be better off and their patients very much so. He had tried to get along with using them only a part of the time. One day he would wear them and would have no trouble. The next day without them he would feel the old sense of fatigue. Since wearing them continuously he had had no trouble. It is probable that some persons go to the age of fifty years without losing the power of accommodation. The majority of dentists probably suffer from some form of eye-trouble. It is likely that very few who have been in practice for ten years have perfect eyes. The reason for this is that a good deal of the dentist's work is done in the back part of the mouth, where the light is poor under the most favorable circumstances.

Dr. W. Geo. Beers, Montreal, Canada, has been a martyr to headaches since he was thirteen years of age, and only recently found out that his eyes were the cause of the trouble. He now has to wear glasses or use a large magnifying glass. As to the troubles of those who suffer from difficulties with the eye without knowing what is the matter with them, could these not be obviated by the use of a large glass at some distance from the patient focussed so as to concentrate the light on the mouth?

Dr. Van Duyn thought that this would hardly correct the evil. It is probable that many of the defects of vision from which dentists suffer existed long before they became dentists, which only makes true what he had said as to the importance of the dentist knowing exactly what his eyes are.

Dr. J. Branston Willmott, Toronto, Canada, would not venture to speak upon the subject, but that possibly the relation of his personal experience might prevent others from suffering a similar penalty for want of knowledge. He was born, he presumed, with a defect of vision,—congenital astigmatism,—but he did not find it out until he was thirty-eight years of age. His eyes did not focus together, and when his sight began to fail he was troubled with a great twitching of the muscles of one eye, accompanied with considerable weakness. Before night came each day he would be wearied out, and sleep failed to restore him to his normal condition. His eyes were examined by an oculist, the difficulty discovered, and glasses were made to correct the astigmatism. The twitching



ceased in one day after he began to wear them, and his health was soon restored to its normal tone. What was singular about the case was that about two years afterward the prescription glasses were broken, and since then he had used ordinary, though strong glasses, without any recurrence of the former symptoms. The wearing of the special glasses seemed to have cured his trouble entirely. He related these facts merely to emphasize the wisdom of consulting a specialist on the first indication of failing or defective vision.

Dr. Truman W. Brophy, Chicago, felt more than usual interest in the subject under discussion, because of the experience he has passed through during the past three or four years. Some four years ago his eyes began to grow weary towards the latter part of the day, and especially along toward the end of the week. He procured glasses, but the examination was not critical, and later it had to be done over. With the first glasses he found that on Mondays he did not need them; on Tuesdays he used them a part of the day, and on Wednesdays and Thursdays from the time he began operating in the morning. During the remainder of the week he was troubled with headaches as before, in spite of the glasses. After two months of this kind of experience he underwent a critical examination by a well-known oculist, who pronounced his eyes hypermetropic, and prescribed the proper glasses. The headaches disappeared at once on beginning to wear them, and he felt far better than for years. It would seem to be the part of wisdom for those who use the eyes much to get glasses early, not only to avoid distressing physical symptoms, but, what is of more importance, to preserve their eyesight through life. Prof. Van Duyn says that hypermetropia is usually congenital. The speaker is satisfied that he had none of it in his earlier years. One thing to which he would direct special attention as of the highest importance to dentists,—the necessity of not using the eyes in a bad light, as towards night. In having glasses made do not have the bows too tight, as by pinching the nose they will cause headache, but have them made to fit on loosely.

Dr. W. H. Dwinelle, New York. As to the question whether a large magnifying glass would correct the difficulty of poor sight, it might do so for the normal eye which was simply growing old; but it could do no good for the astigmatic eye. This trouble is only to be corrected by glasses for the eye. It has been stated that as we grow old the focus of the eye is carried farther back. It sometimes occurs that the sight of old persons is partly restored to the normal condition. This he had observed among several of his patients, one of whom was in his office recently, and her eyes were tested in reading the finest type used in printing. The theory is that in such



cases the retina to some extent takes up the office of the ciliary muscles and so partially restores the lens to its normal condition. We can thus take up the office of the ciliary muscles at any time to some extent, and on this principle some have recommended the manipulation of the eye as a hygienic measure. John Quincy Adams always manipulated his eyes, and he never wore glasses. Dr. Dwinelle is satisfied from experience with his own eyes that this theory has at least a foundation in fact. We know that in the old the eye becomes flattened, which throws the focus out of place, and we can almost recognize near-sighted persons by the shape of the eye, which is much more rounded in the outward contour than the normal eye.

Dr. Marshall wished to offer a suggestion which followed out will afford considerable rest to the eyes during an operation. We all know that when the eye is kept fixed on any one point for a considerable length of time, and more especially if the gaze is intent, it is very fatiguing to the muscles. If the dentist's office is so arranged that he can once in a while look away from his work to some object at a distance, he will find that from this simple act his eyes will be rested; and if he can make this a habit he will be very much benefited.

Dr. Brophy wanted to ask Prof. Van Duyn a question, and he would preface it by the statement that he thought the cause of the trouble with his eyes was a cross-light in his office. The question he would ask is, what light is best for the dentist, and is a cross-light detrimental?

Dr. Van Duyn. The best light comes not direct from the sun, but from a luminous sky or a light cloud. A north light from a cloud is best of all. A cross-light should never be used.

The subject was passed.

Dr. C. S. Butler, Buffalo, read a paper, entitled "The Pathological Conditions of the Mouth due to Artificial Dentures," of which the following is an abstract:

Dr. Butler argued that the presence of an artificial denture upon the mucous surfaces of the mouth may be always considered a cause for apprehension of pathological results. In view, therefore, of the large number of persons who by reason of the premature loss of their dental organs are required to wear artificial substitutes, it is of great importance that the deleterious influences which such appliances often exert should be recognized and eliminated so far as possible. An artificial denture is a foreign body in the oral cavity, and may become, in a greater or less degree, an irritant to the tissues or organs with which it comes in contact. That it is possible for

any mouth long to endure the presence of these bodies without their occasioning pathological disturbances becomes more and more inexplicable as the relations they sustain to each other are studied. Substances so unlike as are artificial dentures and the mucous membrane of the mouth are brought together nowhere else in the human body.

The mucous membrane of the oral cavity and the skin present the same anatomical features with few exceptions. In a normal condition there is a constant production of young cells and a subsequent desquamation of the oldest cells of the epithelial layer. These cells are floated away in the saliva. This exfoliation of the epithelial cells is a physiological process which in health takes place slowly; a too rapid shedding gives rise to pathological changes. Shallow ulcers, aphthæ, or canker are caused by the shedding of the superficial cells faster than the young cells are developed. One of the most favorable conditions for a too rapid shedding of these cells is established under artificial dentures resting upon the mucous surfaces of the mouth.

Artificial dentures of whatever kind are poor conductors of thermal changes, excepting those made of gold and continuous gum, which quickly become such by collecting on their surfaces decomposed mucus, saliva, and epithelial débris; and, therefore, the membrane of the mouth covered by them is kept at a higher temperature than when in a normally exposed condition. The temperature of the body is maintained at from 98° to 100° F. mainly by the dilations or contractions of the blood-vessels at the surfaces, and the cooling of greater or less quantities of blood by contact with the atmosphere. When the vessels contract, the interior temperature of the body is raised by the retention at the surface of the heat produced within. When the mouth is covered to a greater or less extent with a practically non-conducting substance, the heat conveyed to the surface is not radiated, and congestion, inflammation, with not infrequently suppuration, quickly follow, and a too rapid shedding of the epithelial cells is at once established. In normally exposed conditions these cast-off cells are floated away in the saliva, but when the membrane is covered with a plate so closely retained by atmospheric pressure as to exclude the saliva, they must remain as irritating substances upon the mucous surfaces. Very frequent and thorough brushing of the palatal surface of the plate and of the mouth itself would therefore seem to be necessary in order to protect the membrane from the morbid influences of these decomposed cells.

When the air is entirely exhausted from beneath a plate—which is seldom done—there is a pressure upon the outward surface of

nearly fifteen pounds to the square inch. Of course there is an outward pressure in the body which in a naturally exposed condition equalizes the pressure from without. In the case of artificial dentures, however, this antagonism is destroyed by the presence of the plate. Results of a serious character may and often do follow this condition, so that in the construction and insertion of these cases care should be taken that pressure be made equally upon every point.

The mucous membrane of the oral cavity was designed by nature to be exposed to the friction of the tongue, and of food during mastication, and to be constantly bathed with saliva and mucous secretions. These designs are wholly or in part destroyed by the substitution of a dental plate for the lost natural organs. It would seem that such interferences with the naturally established functions of the economy could not long be permitted without noteworthy consequences.

As commonly stated, the saliva has to do only with mastication, deglutition, and digestion, but as there is scarcely a moment under normal conditions when the mucous membrane of the mouth is not bathed with it, it is not unreasonable to suppose it has to do with the health and vigor of that tissue. To protect the membrane from the irritating influences of the atmosphere and to flush away the excreta of the mucus-glands is one of the offices of the saliva in its relation to the membrane it constantly bathes. In the opinion of the essayist, mechanical irritation is more fruitful in the production of abnormal results than all other causes combined. Such irritation may, and undoubtedly often does, cause organic changes,—modifying the nutrition of the parts and giving rise to morbid alterations of structures. It is a well-known fact in pathology that any long-continued irritation may so alter the nutrition of normal structures and foreign growths as to impart to them a semi-malignant or malignant type. The mucous membrane of the mouth is especially prone to organic changes under long-continued irritation. It is easy therefore to understand how it is that pathological changes so frequently follow the wearing of artificial substitutes for the natural dental organs. Perfect adaptation is rarely or never attained, so that local mechanical irritation in all cases is probably far greater than is generally supposed. The mucous membrane is a delicate tissue, and at best dental substitutes are cumbersome contrivances.

No mouth is of a uniform density,—yielding to pressure alike in every part,—so that in the act of mastication the unequal pressure brought to bear upon the denture is in itself sufficient to cause trouble. Until quite recently many of the pathological conditions due to the presence of artificial dentures in the mouth have been



attributed to the vermilion or coloring-matter in the material used in some of the plates. Dr. Edward C. Kirk, of Philadelphia, writing for the "American System of Dentistry" upon this point says, "Many cases in practice tend to a confirmation of this idea, yet a careful analysis of them, as well as the absence of conclusive evidence based upon systematic scientific investigation, fails as yet to establish the truth of such a theory. . . . Cases are frequently cited in support of the asserted poisonous effects of vermilion where the substitution of black rubber for red has overcome the tendency to sore mouth. That this procedure often fails to relieve the difficulty is abundantly proven, though black rubber is an evident improvement upon the red variety, so far as the health of the tissues of the mouth is concerned, it being composed only of pure caoutchouc and sulphur, without the addition of any mineral coloring-matter. The texture of the finished piece is therefore finer, more dense, and less spongy, consequently less liable to absorb and retain the secretions."

Dr. G. V. Black, in Trans. Ill. State Dental Society for 1886, page 188, asserts that sore mouth produced by artificial dentures is due to the growth of certain fungi which elaborate an acid secretion that acts as an irritant to the mucous membrane, producing the condition. He finds these fungi collect upon the surfaces of all plates without regard to the kind of material of which they are constructed, but in the greatest numbers upon the surfaces of vulcanite dentures, which he attributes to the fact that the irregularities and roughness of the surfaces of such plates afford lodging-places where they rapidly develop, because the plate cannot be as readily cleansed. He regards absolute cleanliness as a complete protection from inflammation.

In the early days of rubber, vulcanizing was imperfectly understood; machines were crude and not at all uniform in their products, and as a consequence cases were vulcanized either too hard or so soft as to leave the plate porous and incapable of polish. Such plates were capable of producing great trouble. Mucous secretions and débris quickly filled up the pores in them, decomposing, and so becoming potent irritants. That so many mouths will tolerate for months and years together the presence of such influences without the gravest pathological conditions arising therefrom, still remains one of the unsolved problems.

Dr. C. C. Carroll, Meadville, Pa., in opening the discussion, said that a quarter of a century or more ago, when rubber came into vogue as a base for artificial dentures by virtue of the high price of gold, most dentists were dissatisfied with it, and many of those who have continued to use it are still dissatisfied. Through



this feeling of dissatisfaction he began, about 1860, to experiment with aluminum. Most of us thought at that time that the root of the difficulty with rubber was the vermilion used to impart color to it, but now it is pretty well settled that the primary cause of trouble to wearers of vulcanite dentures is the non-conductivity of the material itself, whence arises a congested condition of the mucous surfaces. There are other reasons for the troubles reported from wearing rubber plates, as mechanical irritation from badly-fitting plates, but the primary difficulty is non-conductivity. Rubber is one of the worst materials to use on account of liability to misfit for when an impression is taken, the plaster expands in heating: it cannot expand laterally because of the sides of the impression-tray, and it must therefore expand vertically. As a consequence, when the model is made it is sunken over the ridge, and the plate made to this model rides on the palate. Continuous gum and gold have been called the best forms of artificial dentures, but we find mechanical irritation of the mucous surface under them; still, that is not the sole cause. There is the same trouble here that was mentioned this afternoon as the cause of caries. It doesn't make any difference how perfect the fit of the plate when it is first put in; after a while just the opposite condition from that found under the rubber plate is seen,—namely, absorption, which he believes is due to electrical action. Gold is positive; enamel is negative; and the saliva is the fluid excitant. In the days when clasps were used the tooth to which the clasp was attached would break down around it. Then it was said that friction was the cause of the breaking down; but that was only a partial explanation: electrical action was the main factor. In this connection he wanted to call the attention of those who do fine fillings to the fact that, let the work of preparation be never so well done, the filling put in never so well, still at that fatal point, the cervical wall, there will be a breaking down. Why? Because of chemical action induced by local electrical influences. In the gold and the enamel are the positive and negative of the battery, and every mouth has an excitant fluid. There isn't a mouth in the room that is not at some time during the day either alkaline or acid. What is to be done? Get a filling-material which will approach as near as possible the electrical condition of tooth-substance. Dr. Black is quoted as stating that the trouble with rubber artificial dentures is due to roughness of the plate. That may be true in some cases. Roughness furnishes a breeding-place for bacteria, and they are always to be found there; hence a smooth plate is undoubtedly better. There is another point to which the paper did not allude. It said that nature required the fluids of the mouth to cleanse the surfaces. Now, every plate should not only

fit the mouth, but it should conform to it. The rugæ of the natural mouth are there for a purpose, and they should not be obliterated or their presence ignored, as is so often done in the construction of artificial dentures. The palate is a sounding-board, and the rugæ have something to do with the resonance of sounds produced. He hoped in the clinic which he purposed to give to demonstrate the superiority of cast aluminum as a base for artificial dentures.

Dr. A. H. Brockway, Brooklyn, had not much to say. If he had spoken before Dr. Carroll he would have said something of the earlier difficulties, but that ground had been covered. He has discussed the subject in society meetings many times during the past twenty years. He had never taken stock in the idea that the trouble caused by wearing rubber plates is due to the coloring-matter. It is not necessary to seek for such an occult cause. To his mind the whole difficulty is that vulcanized rubber is highly non-conducting. Any such substance, be it rubber or anything else, will produce the same result. The origin of lesions caused by metal plates has also been clearly pointed out. The substances collecting there are of an exciting, irritating nature. He looks forward to the time when some substance possessing all the qualities necessary for a perfect base for artificial dentures (though not now personally interested in this department of dentistry) will be brought to the attention of the profession.

Dr. W. C. Barrett, Buffalo, was present when some of the observations of Dr. Black which had been referred to were carried on. He believes that much of the trouble found in the wearing of rubber plates is to be ascribed to the fact that the plate is a non-conductor, and that hence the mucous surface under it suffers, because it is known that alternations in the temperature of the mouth are not conveyed to it. The condition is bettered under a metal plate, but it is not altogether remedied. Anyone who has worn a plate knows that it must be cleaned about once an hour to keep it in perfect condition; and if we come in contact with those which are cleaned only say once a week, our olfactories tell the fact at once—the plate smells sour. If such a plate is exposed to heat we get the putrefactive smell. Those who have had much experience have noticed that after a new plate has been worn only two or three days there is not much odor about it; but if it has been worn a week or more, without cleansing, it has an exceedingly acid, sour smell. Any plate which has been worn long enough for the fermentation under it to get to the acid stage will supply materials for the pure culture of bacteria; and it will be found that some of them are injurious to mucous tissue. Aphthæ are only abrasions where the microbes have formed colonies, and to cure them all that is

necessary is to use something to destroy the microbes. The best way is by cauterizing, and causing a portion of the membrane to slough off. Because there is an acid condition beneath neglected plates he cannot believe that an electrical current is the primal factor. Chemical action may cause electricity, and electricity in the mouth is the result, not the cause of it. But that an electrical current can produce chemical action, he does not believe; it may be transformed, but not in the mouth. He does not believe it possible that any stroke of electricity produced in the mouth can do the slightest harm to the weakest tooth ever found in the human mouth.

Dr. S. B. Palmer, Syracuse. Both Dr. Carroll and Dr. Barrett are right and both are wrong. Dr. Barrett is right when he says that the electrical current is no part of the cause of the chemical action. Dr. Carroll stated the position of the elements wrong; gold is electrically negative to the enamel. The trouble is not that the juxtaposition of the elements sends a stroke, as intimated by Dr. Barrett, but that the elements assume a positive and negative relation toward each other, which the speaker thinks is by converting the saliva into an acid. If a plate is allowed to remain uncleansed long enough in the mouth, it commences to be an incubator and to generate bacteria. He placed a gold plate in the mouth of a gentleman, but he could not wear it, and he had experienced the same effect in his own mouth,—the saliva was thinned, as he believed by the presence of the plate. He cannot wear rubber because of the heat it produces. Gold is all right in his mouth, except for one thing: when any two metals are put into his mouth he knows it at once by the taste, which is not so pleasant as it might be. Consequently some fifteen years ago he had had a cast aluminum plate made.

Dr. Carroll. It has been said that one swallow does not make a summer. Dr. Barrett alluded to the presence of bacteria under rubber plates. Here is an impression of a mouth in which an aluminum plate was worn. He would venture to say that there is not a mouth in which rubber is worn which does not have an irritated palate, yet in this mouth there is not the slightest trace of irritation.

The subject was passed.

(To be continued.)

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#### FIRST DISTRICT DENTAL SOCIETY, STATE OF NEW YORK.

THE First District Dental Society of the State of New York held a regular monthly meeting, Monday evening, November 5, 1888, in the Hall of the New York Academy of Medicine, No. 12 West Thirty-first street. The president, Dr. W. W. Walker, in the chair.



Dr. Meyer L. Rhein, chairman of the Clinic Committee, read the following

#### CLINIC REPORT.

A stated clinic of this society was held this afternoon at the depot of The S. S. White Dental Manufacturing Co., Broadway and Ninth street. Dr. Rodrigues Ottolengui, of New York City, implanted a right inferior central incisor for Dr. Andrews. The previous history of the case is that Dr. Younger at one of our clinics, being disappointed by his patient, accepted Dr. Andrews's offer to submit to the operation of implantation. The tooth selected was somewhat unsuitable and was ground into shape. At the end of eighteen months (February 22, 1888), the tooth being very loose it was extracted, and a microscopical examination revealed a very extensive absorption of the root. Dr. Ottolengui being one of the advocates of the operation, was invited to implant a tooth this afternoon. He used a tooth which was extracted from the mouth of a healthy young person about six weeks ago. The socket was made with but two sizes of reamers, and the tooth placed in position in six minutes. He next applied the rubber-dam about the six anterior teeth, ligated the implanted central into a proper position in the arch, and surrounded the teeth with plaster of Paris. When this had set, the ends of the implanted tooth and its fellow on each side were exposed. Grooves were made in the cutting-edges of these teeth, and they were then permanently united by gold filling, a fine gold wire running through the center. At the completion of the operation the newly-placed tooth was immovably fixed. Dr. Andrews is present, and willing to show the case to those who may desire to see it.\* . . . Dr. M. L. Rhein, of New York City, presented a patient who had been wearing a piece of porcelain bridge-work in the superior maxilla since the first of July. The bridge extended from the last right molar to the left cuspid, and was instrumental at the same time in remedying the abnormal character of the occlusion after the lower anterior teeth and the right upper cuspid were trimmed to the dotted line seen in Fig. 1. (By kind permission these illustrations are taken from Dr. Evans's "Treatise on Crown and Bridge-work," and are thus described by him on page 245 of that work: "The lateral and central roots, and the right cuspid and the molar, constituted the abutments. On the central and lateral roots were mounted caps with collars. A platinum crown was then made for the cuspid (Fig. 2), and to this crown was attached the bar, which was extended to its anchorages in the molar crown and the

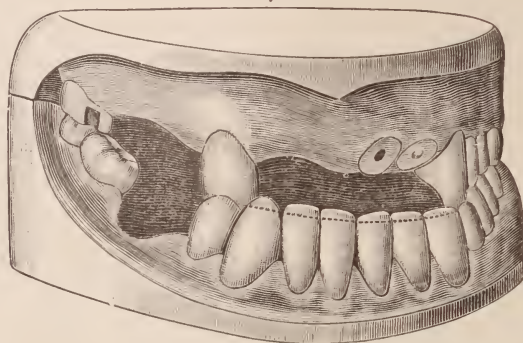
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\* For illustrations of this case see article on Implantation by Dr. Ottolengui in the current number, p. 30.



lateral and central roots, the caps on the ends of which the posts pierced. The artificial teeth were articulated to meet the incisive edges of the inferior natural teeth, and thus in a measure overcome the deformity caused by the abnormal occlusion. In doing this the labial aspect of the cuspid was covered by the artificial teeth.")

FIG. 1.



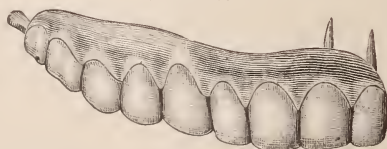
Porcelain gum was then formed above the teeth in a very extensive manner in order to restore the contour of the parts. It was brought to a feather edge and pressed hard against all the tissues, thus effectually preventing an unhygienic condition. A bridge is con-

FIG. 2.



sequently very poor nomenclature for such a case as this, and the word "saddle" would better express our idea. Fig. 3 shows the finished work. In Fig. 4 the bridge is seen in position. . . . Dr. Rhein also presented a young lady, aged about twenty-two, who

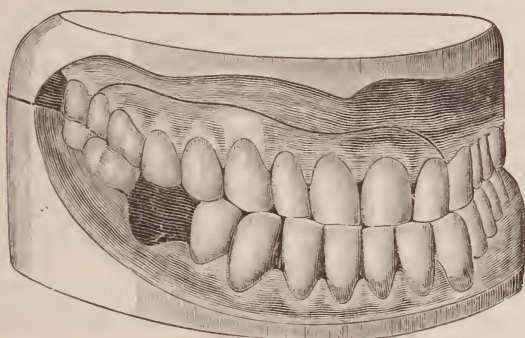
FIG. 3.



two weeks ago had sustained a fracture of the right ramus of the inferior maxilla as the result of the extraction of the third molar. She came to Dr. Rhein two days after the fracture, suffering severely from loss of sleep, neuralgic pains, extensive swelling and displacement. The case was such an exceptional one that it was

not until the following day that a clear diagnosis of an oblique fracture through the ramus was positively made. By this time the neuralgic symptoms had been entirely dissipated by the administration of fourteen grains of antipyrine. He furnished his associate, Dr. Andrews, with three trouser-buckles and some muslin, and in a short time he had improvised from these materials the neat Hamilton bandage exhibited to-day. This will remain two weeks more. The patient keeps the mouth in an aseptic condition by using Listerine ten or twelve times daily. She takes nourishment of a fluid character by means of a glass tube which is inserted through the aperture caused by the former loss of a first bicuspid. . . . Dr. W. C. Deane demonstrated the use of his new tooth-crown mandrel for the cutting of all forms of porcelain crowns having a metal pin. The mandrel has a hollowed recess for the reception and protection of the pin while grinding the crown. These mandrels will admit of any shaped

FIG. 4.



stone so as to facilitate cutting the tooth flat, concave, or convex. He also made a number of corundum points by means of Taggart's corundum punch. . . . Dr. E. T. Starr, of the S. S. White Company, exhibited a dental engine with an enlarged driving-wheel 15 inches in diameter and weighing  $14\frac{3}{4}$  pounds, by means of which a speed equal to that of the ordinary wheel can be attained with but two-thirds the number of movements of the treadle. . . . Dr. J. W. Ivory, of Philadelphia, exhibited a large variety of improved clamps, showing the practical advantages they possessed by adjusting them in the mouth. He also exhibited Dr. Elliot's separator and matrix-holder. . . . Dr. V. H. Jackson, of New York, presented the models of two cases of irregularity for study and advice. . . . Mr. E. E. Clark demonstrated the various uses which the Ward Electro-Metallic Dental Plate can be put to in the shape of bridges, plates, and crowns. He also showed the model of a case of seven anterior lower teeth with living pulps but having lost nearly all of the enamel.

Separate platinum caps have been made for each of the teeth, and porcelain will be enameled over them.

A recess was taken to allow an examination by those present of the implanted tooth in the mouth of Dr. Andrews.

#### INCIDENTS OF OFFICE PRACTICE.

Dr. F. A. Roy stated that he had tried the method of separating teeth with tape as suggested by Dr. Watkins a year or so ago, but finding it somewhat unsatisfactory he had used a different one. He had often used thread tied between the teeth and packed in cotton for the same purpose, but recently he had been using cotton cord, tying it between the teeth so as to surround their approximating contours. It stays in place and does not impinge upon the gums. By it the teeth can be separated little or much according to how the knot is tied. If a surgeon's knot is used it makes a flat wedge and keeps in place. If there are cavities in the teeth he fills them up with cotton and ties the knot around it. There is one objection to the use of cotton, however, in that it becomes offensive if allowed to remain in for any length of time. This may be somewhat overcome by first inserting a small piece of cotton having creasote on it.

Dr. E. Parmly Brown showed some corundum reamers which he had obtained in London. They are intended to cut with a circular motion and to take the place of ordinary disks in preparing teeth for crowning. He had not tried them in the mouth, but he thought they would do all that was claimed for them.

Dr. Horace Dean, of Jersey City, N. J., was here introduced and read the following paper, entitled,—

#### ELECTRICITY AND SULPHUR IN DENTISTRY.

The subject-matter that I wish to present to you to-night is not the record of a finished experience or of a series of valuable experiments, but simply the narration of a few hints which I have been fortunate enough to discover and which I wish to give to you, so that each in his own way may test the matter. For I am convinced that these hints contain germs of truth which in abler hands than mine can be made of value to the profession.

For years I have known in a general way that burning sulphur was valuable as a destroyer of vermin and also of disease-germs, but it was only within the present year that the thought came to me that perhaps it might be equally potent for use in canals containing putrescent pulps. The thought was at once followed by action, and the experiment was so entirely successful that since that time it has been used in each and every such case occurring in my

practice during the past ten months. In the beginning I used a medium-sized probe, which was heated in a flame and dipped in sulphur, and while it was fuming carried to the desired spot. But I soon found that this caused a blackening of the surface of the cavity which was sometimes hard to remove. I then joined a piece of platinum to my probe with better results, but for a considerable time I have used the electric cautery, the platinum-wire loop being small and twisted so as to get sufficient stiffness in a wire small enough to enter the pulp-canal. The results of this treatment are briefly these. It very materially shortens the time necessary to restore inflamed and abscessed roots to health, there is generally an almost immediate cessation of pain, it does away with all other medicaments or disinfectants, and makes out of a troublesome and often unsuccessful operation one that is generally successful and comparatively easy,—so much so, that out of a large number of devitalized teeth whose roots I have opened, cleaned, and filled, I have not had to extract more than five per cent. Such results I have not been able to attain by any other mode of treatment. In order that you may better understand this matter, let us take the superior central incisors and by them illustrate several different operations in which the sulphur is eminently useful. The left incisor we will suppose has a large, shallow, saucer-shaped approximal cavity extending nearly the full length of the tooth, the walls merely plates of enamel, the pulp almost exposed, the dentine hypersensitive, the patient ditto. The cavity as presented has absolutely no under-cuts and no room to make any that will be adequate; and even if we dare drill, hoping to get something from nothing, the patient at once and most emphatically rebels.

I think that here we have the typical hard case, the multiplication of which has put gray hairs on many an honest head. In a large majority of similar cases our sulphur will help us. Before applying the rubber-dam, fumigating the gums with sulphur will frequently render them less sensitive to the cutting of the cord. Then before commencing to bur the cavity we will flood it with the fumes and will generally find a goodly measure of obtunding. It is quickly done, its effect is immediate and as lasting as anything that I know of; it does not materially hurt the patient, and can be applied as often as necessary. After we have cut as much as we dare and are still almost if not quite hopeless of any good result, we will make ready some cohesive cylinders or a mat of Williams's crystalloid gold, also whatever is our favorite in the way of cohesive gold, with which to form the filling. Then we will take the platinum loop and give it the proper heat to just melt the sulphur but not to burn it, and with this smear the floor of the cavity; then while it is yet soft



heat the cylinders and place them on end in the cement, then while everything is still warm and before the cement has become brittle place on the cylinders and press into cohesive contact the masses of gold chosen to form the bulk of the filling. From this point complete and finish as usual.

We will find that we have secured a good degree of adhesion to the cavity, which, taken with the moderate under-cuts, will give us a fairly substantial filling.

Now we turn our attention to the adjoining central, and we find that it is so badly broken that nothing remains but to supply its place with an artificial crown. The canal is filled with a putrid pulp of the excessively malodorous kind, and of course there is an abscess with its accompanying inflammation and pain. The patient, unwilling to be hurt, begs for extraction as the least of two evils; but with a consciousness of being master of the situation, and with a prayer of thankfulness that we are thus master, we speak a word of comfort to the patient and reach for our lightning. With the platinum loop dipped in sulphur the canal is fumigated and with suitable drills opened a short distance, then with medium and small "Morey" drills we slowly advance towards the apex, alternately fumigating and drilling till we reach a point so near the apex that there can be but an infinitesimal portion of septic matter left, and that will be so saturated with the sulphur as to be practically inert. All this time we have avoided with the utmost care going through the foramen, so as not to force any particle of septic matter into the inflamed tract surrounding the root, and which has already as much trouble on its hands as it can well care for. Neither will we put medicaments of any kind in the canal expecting them to go through the foramen. We have removed the cause, and we may well leave to nature the task of curing the effect, provided we do not complicate matters by forcing into that diseased tract hot irritating foreign substances, such as carbolic acid and the like, which if put on a healthy place would cause rebellion most emphatic. At this point you can elect whether you will practice immediate root-filling or do what will perhaps oftentimes be better, close the canal and dismiss the patient for a few days to allow the excitement in the associate parts to subside. If the case should prove stubborn, the sulphur treatment can be repeated as often as necessary. After shaping the end of the root as usual, we are ready to prepare the canal for the crowning process. In cleaning the canal we were careful not to enlarge it more than just enough to remove the septic surface, and we have left its natural taper as nearly intact as possible. We will now take an "Ottolengui" reamer of the smallest size that will fill the canal, and ream it out to the point reached by the drill; this

will give us a tapering hole of a moderate size with a good amount of solid root on all sides. In this we will fit a platinum and iridium pin of the same taper, getting as exact a fit as possible.

Placing this firmly in the canal, taking care however not to fasten it there by too much pressure, we mark the exact spot where it emerges from the root. We will now take an old-fashioned wood pivot tooth and fit it to the end of the root. Then, being guided by the mark on the pin, we will cut the pin to such length as will allow the crown to sit firmly on the root. The pin must now be shortened at the crown end just a trifle, so that when placed in position it will not quite fill the tapering hole in the root and there will be a little space for the sulphur cement around the pin. Now heat so as to dry the crown and fill the hole with sulphur, then holding it in a pair of pliers melt the sulphur. Also have the pin hot and coated with melted sulphur, then place the pin in the hole in the crown in about the proper position and hold steady till cold. Now with the platinum loop dry and heat the canal as hot as is safe and pleasant. If the canal is not dry, the cement will not adhere. With the loop at a low heat smear the inside of the canal and the end of the root, and while it is still warm take the crown this time in your fingers that you may not get too much heat, and heat the pin and thickly coat it with the melted sulphur; then place it in the root, pressing firmly, and at the same time getting the alignment, for the cement that holds the pin and crown together will have softened sufficiently to allow of this. In a few moments all is cool and fast, and you have an operation easily, quickly, and comfortably performed, and one that will stand as long as many a one that has given a great deal more trouble to both patient and operator. If you wish to remove or change the position of the crown, take a small pair of straight forceps and heat the beaks quite hot, and grasp the crown, and in a few moments the cement is soft and you can do with your tooth as you please. There are other uses for the melted sulphur, such as fastening handles to instruments, uniting metals and glass, etc., all of which you can study out for yourselves.

In my remarks to-night I have spoken of my use of electricity only in its relations to sulphur. In reality that is but one of several uses to which I put it. In various ways it is my willing and ever-ready helper, and a source of much comfort to both my patients and myself.

I am well convinced that any dentist with a reasonably full practice would find it greatly to his advantage to have this help, and I feel confident that in a few years it will be as common as the dental engine is now.

President Walker. Gentlemen, I see that we have with us this evening Dr. E. Parmly Brown, of Flushing, who has recently made an extended trip abroad. Perhaps he will give us a few words in regard to what he has seen and heard while in Europe.

Dr. Brown. Mr. President and Gentlemen: I went to Europe this summer by invitation to put in and teach porcelain bridge-work, and I was warmly received. Some of the gentlemen from the colleges in London who visited this country at the time of the International Medical Congress came to my house to study bridge-work, and they took home a number of specimens. In Paris the college faculty asked me to clinic at the college, which I did. I put in about fifty porcelain bridges in England, Ireland, Scotland, Wales, and France. My son went with me, and we took our machinery and necessary appliances. We baked our bridges in the Verrier furnace, and did it very nicely. The Verrier furnace will probably bake porcelain bridge-work better than it will a continuous-gum set. I put in bridges carrying from one to ten teeth. My experience there taught me a lesson. We made some bridges of American teeth and American body, and some of English teeth and English body. We found, in hitching to the gas-jets, considerable trouble in getting enough gas to fuse American body, so we tried the English bodies, and the English teeth and bodies baked beautifully. I would rather use them than the American were it not for the appearance after the bridge is in place; there is an opacity on account of the density of the coloring-matter, which detracts from the beauty of the work. In but two or three cases did I destroy pulps, and then by the instantaneous or knocking-out process. I would say in answer to a query that I never put a ferrule on a root unless it is absolutely necessary. In the majority of cases it will be a bacteria-breeding band and cause recession of the gum. If you have a root where there is not a close attachment of the gum around the neck, a band may be put around it with safety perhaps, and it will probably add to the strength of the work. In making my attachments, I grind the teeth very carefully and cement them in place.

This sulphur question is a very interesting one. I have said for several years that we must have a cement for fastening bridge-work and crowns that can be put in and taken out with heat, and that is non-soluble in the mouth. I have not tried sulphur as a cement, but I have tried other things, and I have perfected a cement which can be put in and taken out with heat, is like glass around the tooth, and which has so far withstood the action of the secretions of the mouth splendidly. It is not made of sulphur.

Adjourned.

B. C. NASH, D.D.S., *Secretary.*



## NEW ENGLAND DENTAL SOCIETY.

At the annual meeting of the New England Dental Society, held in Boston, Mass., November 15 and 16, 1888, the following were elected officers for the ensuing year: C. A. Brackett, president, Newport, R. I.; C. W. Clement, first vice-president, Manchester, N. H.; W. E. Page, second vice-president, Boston, Mass.; E. O. Kinsman, secretary, Cambridge, Mass.; W. P. Cooke, assistant secretary, Boston, Mass.; G. A. Gerry, treasurer, Lowell, Mass.; A. H. Gibson, librarian, Boston, Mass.; A. M. Dudley, Salem, Mass.; L. Rideout, Lynn, Mass.; E. B. Davis, Concord, N. H., executive committee.

EDGAR O. KINSMAN, D.D.S., *Secretary*,  
No. 15 Brattle Sq., Cambridge, Mass.

## CALIFORNIA STATE DENTAL ASSOCIATION.

At the last meeting of the California State Dental Association, the following were elected officers for the ensuing year: W. De Crow, president; T. N. Iglehast, vice-president; W. A. Knowles, secretary; W. Z. King, corresponding secretary; S. E. Knowles, treasurer; and L. Van Orden, Jr., librarian.

W. Z. KING, *Cor. Secretary*,  
1001 Valencia St., San Francisco, Cal.

## 1852—PHILADELPHIA COLLEGE OF DENTAL SURGERY—1856.

A CALLED meeting of the alumni of this college was held in Philadelphia, December 12, 1888, to arrange for a revival of the old Alumni Association. Of these, twenty responded in person or by letter, and with Dr. W. Storer How ('54) in the chair, it was resolved to meet in Philadelphia in February of every year, and that three members should constitute a quorum. The secretary was instructed to invite Dr. James Truman ('54) to prepare a history of the college, with reminiscences of the alumni. Dr. How read a paper entitled "Doctors of Mechanics."

On motion of Dr. John R. Rubencame ('54), Drs. Peirce ('54), Truman ('54), and Garretson ('56) were appointed a committee to present the claims of the college to be recognized by the National Board of Dental Examiners.

Adjourned to meet February 28, 1889.

DANIEL MCFARLAN ('55), *Secretary*.



### ARKANSAS STATE DENTAL SOCIETY.

THE second annual meeting of the Arkansas State Dental Society will be held at Hot Springs, Ark., on the third Wednesday of January, 1889.

L. G. ROBERTS, *Rec. Secretary*,  
Eureka Springs, Ark.

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### MEETINGS OF THE FIRST DISTRICT DENTAL SOCIETY.

IN accordance with a change recently made, notice is hereby given that the regular monthly meetings of the First District Dental Society of the State of New York will hereafter be held on the second Tuesday of each month.

B. C. NASH, D.D.S., *Secretary*.

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### CHICAGO DENTAL SOCIETY—TWENTY-FIFTH ANNIVERSARY.

THE twenty-fifth anniversary of the Chicago Dental Society will be celebrated by a three days' meeting, to be held in the ladies' ordinary of the Grand Pacific Hotel, corner of Clark and Jackson streets, Chicago, Ill., February 5, 6, and 7, 1889.

The Grand Pacific Hotel will be the headquarters for guests, and will furnish rooms above the parlor floor, with board, at three dollars per day. All other rooms at fifty cents per day less than usual rates.

The committee expects to secure reduced railroad rates; therefore the usual receipts should be taken when railroad tickets are purchased, showing the payment of full fare, and the committee will secure reduced rates returning where it is possible.

An exhibit will be made by manufacturers and dealers of novelties in their various lines.

The meetings will be devoted exclusively to the reading of papers and the discussion of professional subjects, and no other business will be transacted.

#### PROGRAMME.

*Tuesday Morning, Feb. 5, 1889.*

The meeting will be called to order promptly at 10 o'clock.

PRAYER, by Rev. G. C. Lorimer, D.D., Chicago.

PAPER—"Gum-Colored Porcelain Fillings." A. H. Thompson, Topeka, Kansas.

Discussion.

PAPER—"A Study of the Effects of Cocaine upon Man and Some of the Lower Animals." C. P. Pruyn, Chicago, Illinois.

Discussion.

PAPER—"Obtundents of Sensitive Dentine." T. E. Weeks, Minneapolis, Minn.

Discussion.

*Tuesday Evening, 7.30 o'clock.*

PAPER—"The Study of Pre-Historic Remains in their Relation to Dentistry." J. J. R. Patrick, Belleville, Illinois.

Discussion.

PAPER—"Caries and Necrosis in their Relation to Practical Dentistry." J. H. Martindale, Minneapolis, Minn.

Discussion.

*Wednesday Morning, 9 o'clock.*

Clinics at the Chicago College of Dental Surgery.

*Wednesday Afternoon, 3 o'clock.*

PAPER—"Antiseptics." G. V. Black, Chicago, Illinois.

Discussion.

*Wednesday Evening, 7.30 o'clock.*

PAPER—with lantern illustrations—"The Development of the Teeth, the Formation of Dentine, and its Appearance in Health and Decay." R. R. Andrews, Cambridge, Mass.

The paper will be illustrated by photo-micrographs, projected on the screen by means of the oxy-hydrogen lantern. Many of the photographs were made for this demonstration; others are from Dr. W. D. Miller's beautiful lectures on Natural and Artificial Decay.

Discussion.

PAPER—"Artistic Methods in Prosthetic Dentistry." Illustrated by large cartoons. L. W. Comstock, Indianapolis, Ind.

Discussion.

#### CLINICS.

Clinics will be held on Wednesday and Thursday mornings at the Chicago College of Dental Surgery, northeast corner Wabash avenue and Madison street. They will begin promptly at 9 o'clock.

*Wednesday, February 6.*

J. B. Vernon, St. Louis, Mo., Bridge-Work.

C. Thomas, Des Moines, Iowa, Porcelain Fillings.

Francis Peabody, Louisville, Ky., Filling Root-Canals with Lead Points.

C. S. Case, Jackson, Mich., will demonstrate his method of making Artificial Vela and Obturators for Cleft Palate, provided a subject can be secured.

A. H. Thompson, Topeka, Kansas, Gum-Colored Porcelain Fillings.

E. T. Darby, Philadelphia, Pa., Filling with Crystal Gold; and the Use of Matrices.

A. W. Hoyt, Chicago, Ill., Porcelain Fillings Secured by Gold Fillings.

S. G. Perry, New York City, will demonstrate the application of Perry's Separators, and the Weber-Perry Engine and Mallet.

T. E. Weeks, Minneapolis, Minn., Setting of Logan Crown with Gold Attachment, showing original Method of Investment for Soldering.

D. F. McGraw, Mankato, Minn., Obtunding of Sensitive Dentine, and Controlling of Peridental Inflammation by Electrolysis.

J. W. Wick, St. Louis, Mo., his method of Gold Filling.

Louis Ottogy, Chicago, Ill., Implantation.

*Thursday, February 7.*

T. L. Gilmer, Quincy, Ill., Gold Crown Telescoped over a Platinum Band; also a Combination Crown of Platinum and Weston's Metal, or of Gold, Porcelain, and Weston's Metal.

E. H. Allen, Freeport, Ill., Gold Filling, using Electric Mallet.

C. N. Johnson, Chicago, Ill., Gold Filling.

C. W. Lewis, Chicago, Ill., Herbst Method.

J. G. Reid, Chicago, Ill., Copper Amalgam.

M. E. Smith, Chicago, Ill., Gold Filling, using Snow & Lewis Plugger.

W. H. Taggart, Freeport, Ill., will show a new Root Trimmer and a New Suspension Engine.

J. W. Wassall, Chicago, Ill., will demonstrate Root-Filling with Chloro-Percha and Gold Points; also the use of McKellops's Platinum Gold Broaches.

E. A. Royce, Chicago, Ill., Gold Filling, using Abbey's Non-Cohesive Gold in Cylinders.

T. S. Waters, Baltimore, Md., Movable Bridge.

R. B. Winder, Baltimore, Md., Movable Bridge; also a new Rubber-Dam Clamp combined with a Cheek-Holder; also a Separator.

Henry A. Parr, New York City, Movable Bridge.

J. A. Woodward, Philadelphia, Pa., Reflector for Lighting the Mouth.

J. N. Farrar, New York City, is expected to be here and will exhibit his Regulating Appliances.

J. N. CROUSE,  
GEO. H. CUSHING, } *Ex. Committee.*  
E. NOYES,

## DENTAL COLLEGE COMMENCEMENTS.

### UNIVERSITY OF CALIFORNIA—COLLEGE OF DENTISTRY.

THE seventh annual commencement exercises of the College of Dentistry of the University of California were held at Metropolitan Hall, San Francisco, Cal., December 4, 1888, at 8 P.M.

The address for the faculty was delivered by A. A. D'Ancona, M.D.

The number of matriculates for the session was twenty-nine.

The degree of Doctor of Dental Surgery was conferred on the following graduates by Horace Davis, A.B., president of the university :

NAME.	STATE.	NAME.	STATE.
Ira Hart Chapman.....	California.	Joseph Pfister.....	California.
Samuel Alston Hackett.....	California.	William George Shankey.....	California.
Frank Lewis Hultberg.....	California.	Edward Nelson Short.....	California.
Philander McCargar.....	Nevada.	Charles Sawtelle Weston.....	California.

## EDITORIAL.

### DENTAL LEGISLATION.

THE Illinois State Dental Society in May last appointed a legislation committee which has just issued a circular calling upon dentists for information relating to existing laws in the several States. 1st. What results, and how obtained. 2d. Peculiar features, or amendments; their objects and results. 3d. What defects in the law, or its workings? 4th. What suggestions regarding a new law, its means of execution; or improvements in the present law, and the means of its execution and enforcement?

Respecting the present Illinois dental law, the committee finds that the revenues of the Examining Board are insufficient for the execution of the law; and proposes to either raise the license and examination fees (now only \$1.00 and \$2.00), or levy an annual registration tax on each practitioner. The law does not define a practitioner of dentistry, consequently persons can do business through so-called students and defy the board; and on the contrary *bona fide* students have been arrested for "practicing without a license."

Information and suggestions on all these and other points will be welcomed by the chairman, Dr. C. Stoddard Smith, 103 State Street, Chicago, Ill.

## THE DENTAL PROTECTIVE ASSOCIATION OF THE UNITED STATES.

AN association entitled as above has been incorporated at Chicago. "Its object at present is, in a lawful and equitable manner, to unite the strength of our profession to contest the patents of the International Tooth Crown Company, the validity of which has not been established."

A circular, supplemented by a copy of the by-laws of the association, will impart the requisite information to all dentists who may address the chairman of the board of directors, Dr. J. N. Crouse, 2231 Prairie avenue, Chicago, Ill., or Lyman J. Gage, vice-president First National Bank, treasurer.

## ODONTOLOGICAL SOCIETY OF PENNSYLVANIA.

THE tenth anniversary of this flourishing society was held in Philadelphia on the 12th and 13th of December in accordance with the programme published in the last issue of the DENTAL COSMOS, page 926. The crowded condition of our previously made-up pages precludes the possibility in this issue of more than mention of the facts that the programme was realized in nearly every detail and in a most exemplary spirit and admirable manner. This was due not only to the efficient executive committee, but in large measure also to the modest and tactful administration of the society's president, Dr. E. C. Kirk.

The attendance was very large, including representative dentists from Boston, New York, Baltimore, Washington, and Chicago.

The crowning feature was the exhibit of Drs. Andrews, Allen, and Sudduth by a lantern projection on a screen which afforded a field of twenty feet in diameter, showing with unparalleled clearness from photo-micrographs, pathological dentine with micro-organisms (apparently three inches long by one inch in diameter) *in situ*, a feat never before accomplished. Identical organisms were shown in artificial carious dentine produced by the process of Dr. Miller, of Berlin, whose synthetical demonstration of the etiology of dental caries was thus verified by indubitable ocular evidence. Such marvelous refinement and accuracy of histological investigation has not been hitherto reached in any department of pathology, and furnishes at least one illustration of the somewhat anomalous condition of the branch having outgrown the tree.

A detailed report of the papers and clinics will appear in a succeeding issue. The social feature was an elaborate supper, eminently conducive to fraternal fellowship. The meeting will long live in the memory of the society and its guests.



### "THE PALATAL RUGÆ IN MAN."

WE have pleasure in transferring to our pages this interesting paper by Dr. Harrison Allen. Its perusal should stimulate dentists of scientific aptitudes to a closer scrutiny of structural variations and symptomatic diversities in maxillary dependencies such as have attracted the attention of this acute observer, who has contributed to the DENTAL COSMOS several articles of great suggestive value to thoughtful members of the profession.

To these this record of careful and discriminating inspections of the forms, positions, relations, and significancies of the human palatal rugæ should prove a revelation of how much the alert physiological student may discover that is quite unnoticed by the merely mechanical manipulator of the masticatory machinery who has in view only its regulation or repair. There is urgent need for more strictly scientific students among practitioners of dentistry.

### A MERITED RECOGNITION.

CHEERFUL acknowledgment is made of valuable assistance in the conduct of the DENTAL COSMOS rendered within the past three years by Dr. W. Storer How. To his technical qualifications the readers of the journal will continue to be indebted for the presentation with concise description and intelligible illustration of the various dental appliances and methods which may from time to time appear.

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### BIBLIOGRAPHICAL.

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THE DISPENSATORY OF THE UNITED STATES OF AMERICA. By DR. GEORGE B. WOOD AND DR. FRANKLIN BACHE. Sixteenth edition, rearranged, thoroughly revised, and largely rewritten. With illustrations. By H. C. WOOD, M.D., LL.D., JOSEPH P. REMINGTON, Ph.M., F.C.S., and SAMUEL P. SADTLER, Ph.D., F.C.S. Octavo, pp. 2091. Philadelphia: J. B. Lippincott Company, 1888. Price, cloth, \$7.00; leather, \$8.00; half-Russia, \$9.00.

In the preparation of the sixteenth edition of this stupendous work the publishers announce that five hundred pages of effete matter have been eliminated, and eight hundred pages of new material added, including the latest information about the mydriatic alkaloids, the new antipyretics, antiseptics, etc. The National Formulary has been included,—a convenience which practical pharmacists will highly appreciate.

It is fifty-six years since Dr. George B. Wood penned the preface to the first edition of this work, and meanwhile with each succeeding

edition the demand for it and the confidence in it have steadily increased, and it is to-day more than ever before the recognized authority and standard of pharmacists and physicians. The three editors—one for each branch of the subject-matter—brought to the work a special preparation and fitness, and have performed their difficult and important task with an evident sense of the immense responsibility resting upon them.

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#### TRANSACTIONS OF THE NINTH INTERNATIONAL MEDICAL CONGRESS.

This voluminous work is just out, and will be duly noticed in a subsequent number.

#### PAMPHLETS RECEIVED.

Report of the Pennsylvania State College for the year 1887. Part II—Agricultural Experiment Station. Octavo, cloth, 226 pages.

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## PUBLISHER'S NOTICE.

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### THE DENTAL COSMOS FOR 1889.

WITH this number the DENTAL COSMOS enters upon its Thirty-first Volume, with a larger subscription list and a wider circulation than ever before,—we may say, indeed, with an unparalleled increase.

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## PERISCOPE.

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THE PALATAL RUGÆ IN MAN.—The structures of the body which are the most constant and those which are the most variable have alike an interest to the biologist and to the physician. When constant they present characters which may be employed in classification, and when variable they are accepted as delicate tests for the activity of the nutritive and developmental processes. I propose in the connections last named to study the folds or rugæ of the hard palate as they are seen in the human subject after the period of infancy, especially in subjects who have reported to me for the treatment of chronic nasal catarrh. A group of minor structures is here met with which can be presented in a systematic manner notwithstanding the wide range of variation they exhibit.

What variations from the type met with in the lower animals are seen in man? How do these variations in turn associate themselves with morbid states? With what structures do these variations correlate? What forces are at work to produce in man results so different from those seen in the animals related to him?

I will attempt to answer these questions. I will also give among related appearances those which may have a clinical significance.

In the main it may be said that the rugæ of the lower animals form a constant series. But instances of irregularity can be given. They are much broken up in the posterior part of the palate of the hog. A slight asymmetry often exists in the horse; and instead of being in opposite, it may be in alternate series. For a full discussion



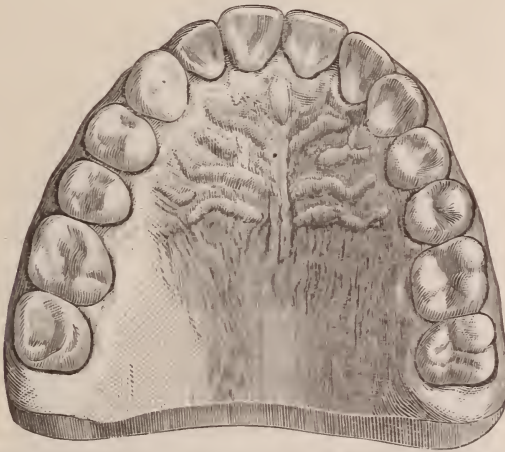
of the subject with literature, especially for the description of the human rugæ in the embryo and infant, see Carl Gegenbaur, *Morpholog. Jahrbuch*, iv, 673.

The following embraces a brief description of the rugæ in man and a list of names which will be employed in this paper.

Two kinds of rugæ are recognized, the longitudinal and the transverse. The *longitudinal* lie in the median line and answer to the line of union between the right and left maxillæ and premaxillæ; the *transverse* lie across the palate and are composed of a right and left set.

The longitudinal kind is divided into two parts, viz: the *raphé*, or the seam-like line which occupies the middle of the palate at the maxillæ, and the *incisive pad*, which is an elliptical or pear-shaped body which answers to the position of the incisive foramen.

FIG. 1.



The arch is wide and moderately arched. The rugæ as a rule are entire,—the exceptions being both first post-sutural rugæ, and the last post-sutural on the left side. The neck-folds are conspicuous.

The raphé is ordinarily composed of two parts, one of which represents the median line and the other is deflected from it to the left at the posterior free end. (See Figs. 2, 4, 7.)

The rugæ extend back no farther than the first molar tooth. The region answers to an imaginary plane which bisects the infra-orbital foramina. The rugæ are composed of papules which are arranged in series, an arrangement which is most evident in the posterior folds. The folds are smallest where the membranes are the thinnest and are the largest where they are the thickest.

As a rule the incisive pad is in line with the raphé, but it may be deflected (see Fig. 3) or continued forwards between the central incisors (see Fig. 5). Occasionally the anterior end can be seen from the front lying in the interval between the teeth named. It may persist in the aged long after the loss of the incisors. When the deflection is decided it enters into the causation of *torus palatinus*.\*

\* For reference to *torus palatinus* see W. Sommer, *Virchow's Archiv*, 1883, vol. xciv, 21.



The largest transverse fold lies between the cuspid teeth or between them and the first bicuspid, and answers to the suture between the maxilla and the premaxilla. It will receive here the name of the *sutural ruga*. The sutural ruga is the widest of any in the entire series. It is usually inclined somewhat backward, but never forward. A deep sulcus is often seen at the base of the sutural fold anteriorly.

The sutural fold divides the hard palate into two parts, the pre-sutural and the post-sutural. The pre-sutural space thus answers to the premaxilla and has but one ruga\* (see Fig. 2). The post-sutural space has four to seven rugæ, which are named in order from before backward, the first, second, third, fourth, etc. Of these folds the third is the best developed. As a rule the first and the second are the least so, and are represented usually by small nodules, or by

FIG. 2.



The arch is flat and wide, the rugæ entire; no hyperostosis is present; moderate lateral concrescence is seen on the left side.

groups of papules, at the outer portion of the vault. They are often aborted. The fifth, sixth, and seventh are also often aborted or represented by faintly expressed broken sinuate lines. The pre-sutural portion of the vault is nearly flat, and is of a special use in presenting a firm surface for the tip of the tongue to press against in mastication and in speech. The post-sutural space is concave with an abrupt declivity forwards. The alveolar processes of the molar range and the declivity named bound the true palatal vault. It presents extraordinary varieties, no two subjects being in all respects the same.

The pre-sutural rugæ were found in an examination of 90 examples of hard palates, present on the right side alone in 11, on the left side alone in 1, on both sides 17, absent in 50, doubtful in 11. Occasionally a system of minute raised folds extends from the raphé outward in the spaces between the rugæ.

The roof of the mouth at the region of the incisors and the

\* Some of the figures show neck-folds, which must not be confounded with rugæ.

bicuspid is distinguished from that of the molars by the presence of folds of gum-tissue placed at the necks of the teeth. These may receive the names of the *neck-folds*. They indicate a disposition of the mucous membrane to be in excess at the parts where the palate is the narrowest. They often entirely occupy the pre-sutural space. The rugæ, as a whole, are the best developed in the regions where the neck-folds are found.

Each palatal ruga is divided into a median and a lateral part. The median part, as a rule, is crescentic in outline with the convexity directed forwards. The lateral is directed forwards. Taken together the last-named folds are arranged in vertical series (*i.e.* with the main axes of the crowns of the teeth), and are either separated by intervals of equal size or are clustered at the alveolar border opposite the bicuspid.

FIG. 3.



The palate is moderately high arched. The lateral elements are elongated. The median elements are either too faint to be apparent or are absent.

The right lateral incisor is absent and the incisive pad shows an inclination to the side of defect. The left sutural fold is directed backward at the raphe.

When the two parts (the median and the lateral) are contiguous the rugæ may be said to be *entire*. But when they are separated by intervals more or less appreciable they may be said to be *broken*. In palates of a moderate curvature, *i.e.* midway between the flat and the high vaults, the folds may be evenly disposed and be without break on one side while they are irregular and broken on the other. The left side is commonly the most developed, a feature which the rugæ exhibit in common with the mandible, the left ramus of which is commonly the larger.

An elliptical exostosis which is often met with on the roof of the mouth is almost always larger on the left side. The left sutural ruga (see Fig. 3) is generally prolonged back farther than is the right. A similar disposition is seen in the first post-sutural ruga, but to a less degree. The post-sutural rugæ, especially on the right side (see Fig. 9), may extend obliquely forward. The third is commonly so placed, but the fourth, fifth, and even the second may

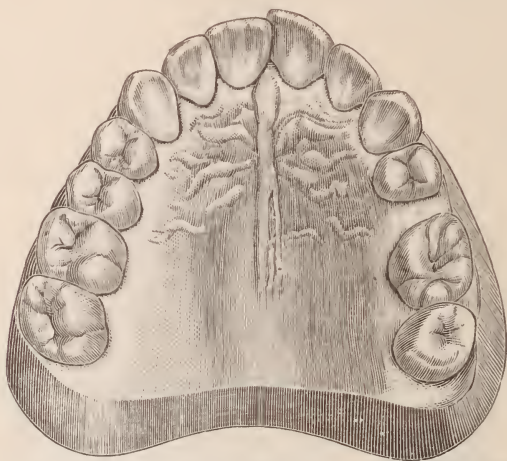
illustrate this disposition (see Fig. 8). As opposed to exostosis the term *hyperostosis* will be employed to denote the general excess of bone-deposition along the line of the intermaxillary suture. It is a common form of hypertrophy in the Anglo-American, and one which has a distinct clinical significance (see Fig. 5).

The union of the right sutural and post-sutural rugæ so as to present a fork-like figure, the arms of the fork projecting outwards, is frequently seen.

The incisive pad, the raphé, and the two sutural rugæ in rare instances may coalesce and give rise to a conspicuous cruciform figure.

The vertically placed lateral ends of the rugæ are by far the most constant of any parts of the series. They are especially well developed in high, narrow vaults.\*

FIG. 4.



The palate is normal in curvature. The incisive pad and raphé are continuous. The sutural folds are entire, the left fold extending farther up along the raphé than does the right. Median concrescence is seen on the left side.

The course of the posterior palatine vessels and nerves serves as a guide to interesting conditions of the hard palate.

The mucous membrane is pale where it overlies tissues which are not in contact with the bone. The interval between the raphé and the sides of the vault is marked by a whitish surface which yields to pressure. In some individuals this motion can be traced as far forward as the first post-sutural fold. The tract is best developed when the roof is normally formed. With a flat arch and a median exostosis present, the track is small. With rugæ well shown, but broken, the place of the interruption occurs across the track. The pale tracks appear to be entirely absent in high, acute arches. An association of the track and the color-marking of the hard palate can also be detected. The high-arched palates are uniformly of a red color, while the flat arches are red only along the median line

\* In the horse the roof of the mouth is very vascular. In *Mephitis* the pre-sutural portion appears to be in a similar condition. The exact limitation of this part of the roof is of interest and, so far as it goes, supports the position taken that the rugæ are naturally divided into a pre-sutural and a post-sutural set.



and at the region of the gum. A test exists here for the rate of blood-vessel activity of the palatine structures and, by inference, of the rates of development of the maxilla.

*Variations of the Rugæ.*—At the risk of repeating some of the facts of the preceding description, it is proposed to discuss under this head the principal variations of the rugæ. They will be included under the following propositions:

I. The rugæ of the left side tend to be the better developed. (See Figs. 3, 4, 5, 6, 7, 8.)

II. The rugæ of high laterally compressed as well as the wide, flat vaults are apt to be entire. (See Fig. 8.)

III. The rugæ of vaults whose median suture has become the seat of general hyperostosis are always broken. (See Fig. 5.)

I. Not only is the group of rugæ on the left side more prominent than on the right, but the distance from the median line to the cuspid tooth is greater on the left than on the right side. The pre-sutural space is slightly the more prominent on the left. The left sutural ruga is apt to be inclined backward as it approaches the median line to a point beyond that reached by the right. The right side exhibits a forked sutural ruga, and a larger first post-sutural fold than is seen on the left (see p. 72). The obliquely placed last post-sutural fold is as peculiar to the right side as the deflected sutural is to the left.

II. The rugæ of the high compressed vaults not only tend to remain unbroken but are well developed. The membranes are thick, cushiony, and vascular. The incisors are thrown forward, since they cannot be accommodated in the narrow space between the cuspids, or the teeth last named remain out of the arch.

The skeleton is slight, and the tonsils large if not hypertrophied. The hard palate with a wide, flat arch is associated with thin rugæ whose intervals are wide (see Figs. 2 and 9). The sutural rugæ tend to be deflected less than in the other types. A hyperostosis is common.

III. The form of the wide arch which is modified by the hyperostosis of the median structures of the palate is an illustration of the disposition of the bones where they unite one to another by suture to exhibit excess of nutrition.\*

The raphé is exaggerated, a median bony ridge extends along its line, the pre-sutural region is occupied by thick membranes and prominent neck-folds. The left sutural ruga is apt to incline backward at the median line. The right sutural fold is united with the third near the raphé. This group is frequently met with in subjects of nasal catarrh.

*The Rugæ of Man as compared with those of the Lower Animals.*—A generally accepted method of study embraces the variations of human structures and those of the lower animals in which these "variations" are constant.

Most variations in human anatomy are said to be reversions. While this method is a most valuable one it has a limited use when applied to the study of the rugæ, excepting in the instance of the broken rugæ, and even here the comparison is not exact.

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\*See a paper by the writer, *Am. Journ. of the Medical Sciences*, 1870, 405.



The human rugæ derive their peculiarity from two causes: *First*, the divergence from the median line of the dental arches as they are traced from before backward; this is much greater in man than it is in the lower animals. Out of 96 examples of dental arches examined by me 58 were found to be deflected more on the left than on the right (see Figs. 3, 4, 5, 6, 9), 21 deflected more on the right than on the left (see Figs. 1, 2), while 17 only were symmetrical. If, as I have assumed, the folds in part at least are the result of compression, it follows that abrupt and varying deviations of the boundaries of the palate must greatly disturb the harmonious development of its rugæ.

The deviations of the curves of the vault, especially when interrupted by a disposition to hyperostosis, must also be a disturbing influence. In 90 examples of palates the hyperostosis itself was found in 51. This is certainly a remarkably high proportion, and

FIG. 5.



The arch is wide. The raphe lies on a conspicuous ridge which forms a hyperostosis. The rugæ are irregular; while some in advance are long and entire, others are converted into clusters of coarse papillæ.

when it is remembered that the specimens were from the mouths of patients who were suffering from chronic nasal catarrh, the association is suggestive of a relation between coincident causes.

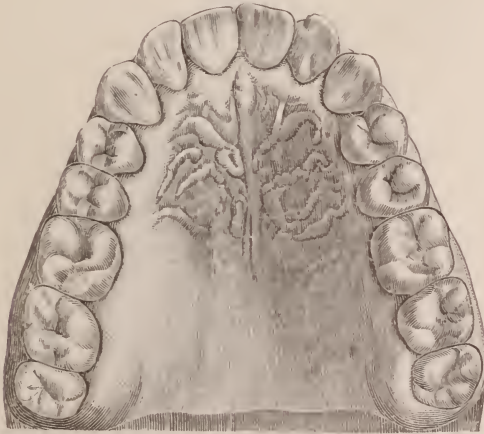
Again, in 90 examinations the sides of the vaults along the range of the bicuspid and molars was in 27 instances, both right and left, nearly vertical, in 47 both sides inclined moderately outward, 3 had right side vertical and left inclined, 4 had the left side vertical and right inclined, and in 9 the inclination was undetermined.

*Second*, the extraordinary modifications in the proportions of the face. The face, stunted as it is in its antero-posterior dimensions, compensates for this defect in a great tendency to downward growth. The premaxilla is enormously thickened as it enters into the composition of the mouth; the sides of the vault including the alveolar processes are greatly elongated; and the sutural line of the maxillæ tends to become hyperostosed in the region of the rugæ or a separate exostosis forms back of it on the free surface of the palate. It has been seen how the presence of the hyperostosis modifies the shapes

of the rugæ. The firm suture between the premaxilla and the maxilla determines the greater size of the ruga which answers to it. The sides of the vault drag the lateral part of the rugæ of the post-sutural set from a horizontal to a vertical and forward position. The median hyperostosis breaks the rugæ into parts,—a condition never seen so far as I know in any quadruped. The changes are in illustration of the well-known law that peripheral structures are conformable to the deeper-lying tissues with which they are in correlation.

One of the most conspicuous appearances in the human rugæ is the approach of two or three folds towards one another either at the median or lateral ends. It is most marked in children in the lateral ends (where they are clustered towards the deciduous cuspids and molars), and in adults at the median ends anteriorly.

FIG. 6.



The palate is wide, but with deep recesses from a moderately high arch back of the sutural rugæ. The lateral elements on the left are regular and elongated; those on the right are unusually irregular, and first and second post-suturals very oblique. The median elements on both sides are strangely disturbed. Median concrescence exists on both sides.

The third and fourth rugæ of the right side have marked special dispositions to incline forward and inward, often cutting off the first and second folds or causing them to disappear. The convergence may go so far as to effect union between the different folds. Especially is this the case between the sutural fold and the third on the right side, by means of which the forked appearance is seen (see Fig. 8). In some examples the sutural fold is united with the third behind, and with the pre-sutural in front.

In 90 specimens examined I found the lateral ends of the left rugæ convergent in 19; the lateral ends of those of the right side in 10; and on both sides in 11.

In the same number of specimens I found the median ends convergent in the left side in 6, on the right side in 4, and on both sides in 5.

The rugæ may be convergent on one side and transverse on the other. It is thus seen that the disposition of the rugæ to form little clusters is noticeable.

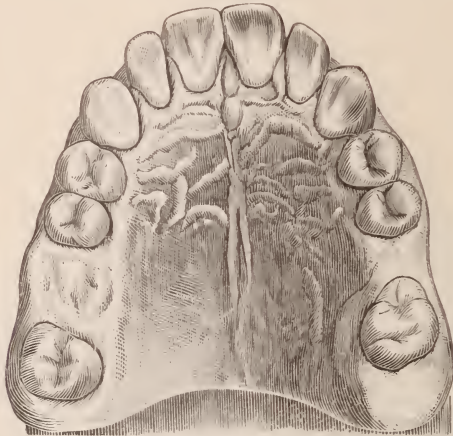
The inclination for the third, fourth, and fifth rugæ on the right side to incline forward is especially marked.

In 90 specimens I found the right rugæ thus inclined in 33, the left only in 2, while in both right and left 16. In the whole number the inclination of the third rugæ is the rule. The disposition is marked in palates with hyperostosis.

The median half of each ruga may incline independently of the lateral, but the inclined fold is, as a rule, entire. The degree of inclination is variable, but it may be expected to be so great that the sutural and post-sutural folds may unite.

The approach of the rugæ one to another their entire length is much less frequently seen than the foregoing. The sutural, the third and the fourth post-suturals may be coalescent. In 90 examples this was noted on the right side 9 times, on the left 6, and on both 2.

FIG. 7.



The incisorial pad is divided by a transverse groove. The raphé shows a tendency to right and left subdivision. The left sutural ruga is deflected backward along the raphé. The post-sutural rugæ are irregular. A small pre-sutural ruga is evident. The right post-sutural rugæ tend to be oblique, especially in their displaced median elements. Median and lateral concrescence is shown on the right side.

The union of the sutural and pre-sutural I have seen but once. It was symmetrical.

The folds may be contiguous only. In 90 examples I found the arrangement on the right side 3 times, on the left 1, and for both 5.

It is probable that some forces create the variations above noted, which are distinct from those already named. They are evidently often out of harmony with one another,—the right side exhibiting their effects oftener than the left. Sometimes they are operating on the ends of the folds, sometimes in their entire length of the median halves. That they are correlative with morbid phenomena is undoubted (see p. 78). For the clumping of the rugæ their entire length is often found in atrophic fetid catarrh, and in the senile state. But it may be so by coincidence. No data exist which cover the entire range of appearances. Certainly nothing comparable to such dispositions is seen in the lower animals.

The term *concrecence* is an exact and convenient term to use in describing this class of modification of the rugæ.



The common abortion of the first and second post-sutural rugæ is not the least instructive of the changes effected by concrescence.

The deflection of the left sutural fold backward along the raphé is probably also an example of concrescence. But for some reason it does not tend to unite with the post-sutural.

Of 90 examples I found the left sutural ruga thus deflected in 49 instances, the right in 3 instances only, and on both right and left 5 instances. In all the other examples the fold was transverse. In deflection it must be noted that the ruga after reaching the raphé is thence abruptly turned so as to be parallel with that structure. Both the right and the left fold may be inclined back before approaching the raphé, or may not reach it at all.

The forms of the rugæ are never pathological as I venture to define that term. The question to what extent variations of structure may be said to be pathological is no longer a novel one. The fact that the forces operating in the economy often antagonize is generally accepted. Upon this antagonism the approach to symmetry as seen in the paired structures alone depends. In the plastron of a turtle (*Chrysemys picta*) in my possession, the plates exhibit a constant disposition for those of the right side to crowd and minimize those of the left. The same disposition for one side to gain ascendancy is seen in all paired structures which form by their growth inward a median suture or raphé. If such minor variations were to be called pathological, every living creature would be an epitome of morbid anatomy. Anatomical variation I assume to be a better term for such deviations, unless the structures are hurtful to the individual or at least tend to be so. A pathological condition is one in which the final effect is to create distress or to excite lesion. Prof. Alpheus Hyatt has described certain distorted shells found by him as constituting pathological species. Are not such species degraded or reverted, rather than pathological forms? The comparison sometimes made between the horn of the rhinoceros and the epidermic hypertrophies which appear upon the surface of man and some of the lower animals, is based upon the conception that the outgrowths are in both instances of the same nature,—that they are both pathological, and differ only in the single feature that the rhinoceros by the law of selection has utilized a horn which happened to appear at a convenient locality. To my mind the structure is not pathological unless it expresses perverted function or interferes with a function; not only this, but that it interferes in an abrupt, obstructive manner. If it does not so appear, but in such guise as to encourage the animal to use it, the organ should be named an anatomical variation.

The word pathology is an anachronism in a system of biology. It originated at the hands of observers who had imperfect conceptions (if indeed they may be said to have any at all) on the general physiological laws operating in all the tissue-changes of the body. What was once "morbid" is now natural. If the word is to be retained by naturalists, it should have a strictly medical application,—the one originally designed for it by practical men.

*The Correlation between the Rugæ and the Interior of the Nose.*—I have met with ten examples in which the left side of the nose was smaller than the right, and in which the same side of the hard palate was also the smaller. Care must be taken to distinguish the common



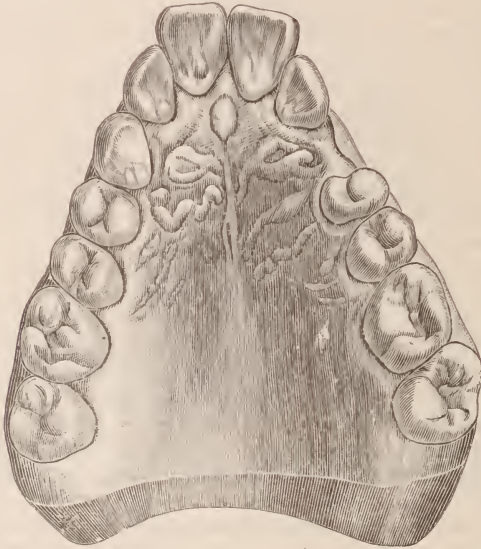
variety of narrowing of the nose by a deflection of the septum from the much rarer form or reduction of the chambers in all directions.

In six cases the right side of the nasal chamber was the larger, and a corresponding increase in size of the right half of the palate was detected.

But the association between palatal and nasal conditions is by no means uniform, and at the same time I cannot conclude that the cases brought forward in evidence were coincidences. I have studies of individual cases in which not only was harmony present between the proportions of the nose and the hard palate, but between these structures and the cranium as well.

It may be said that, in a manner, the law of symmetry is not without exemplifications in the harmonies of the arrangement of the sides of the hard palate with the nasal chambers and with the

FIG. 8.



The arch is narrow and high, the pre-maxillary portions being thrown forward. Hence the space between the sutural rugae and the incisorial pad and all the parts in advance of the sutural rugae are exceptionally open. The third post-rugae is confluent with the sutural on both sides. The pre-sutural rugae are absent.

corresponding side of the head, but that this exemplification is subject to so many exceptions by the operation of minor disturbing factors as to be rarely present.

In examples of hyperostosis of the inter-maxillary suture the inferior turbinated bones are high and apparently compressed. This condition is often associated with imperfect development of the vomer at the choana. The same peculiarity is found in high V-shaped vaults.

A well-defined group of subjects exhibit intumescent states of the membranes of the premaxillary portion of the nasal chamber, a rounded nodule projecting from the floor of the vestibule, a prominent anterior end of the inferior turbinated bone, and a tumid state

of the membrane covering the septum. While such pronounced morbid appearances are seen in the front of the chamber, the remainder of the nasal surface is perfectly healthy. Coincident with these peculiarities of the nose the roof of the mouth is distinguished by a small incisive pad and coalescence of the sutural and the third post-sutural folds. The tonsils are moderately enlarged.

*The Relation between the Rugæ and the Teeth.*—The relation existing between the rugæ and the teeth is not as important as would at first sight appear. For the pre-maxilla it may be said that no influence is exerted by the incisor teeth over the pre-sutural rugæ. The sutural ruga is directly opposite the cuspid teeth, the first post-sutural directly between the cuspid and the first bicuspid, the second ruga opposite the bicuspid, etc. In the *Proceedings of the Academy of Natural Sciences of Philadelphia*, p. 310, 1882, I proposed a system of naming of the parts in accordance with these facts. But it is less satisfactory than the one used in this paper.

Nevertheless the following statements would confirm the position assumed that some connection between the rugæ and the teeth must be accepted to exist.

The axis of the incisive pad when deflected from that of the median line is inclined towards the side which is minimized by the non-appearance or extraction of one of the incisor teeth of the permanent set, by the eruption of a tooth on the buccal or labial side of its arch, or by some third related cause (see Fig. 3).

In one adult subject whose palatal vault exhibited straight, regular, unbroken rugæ on the right side the left retained all the rugæ broken and parts of two entering into the composition of the pre-sutural and the sutural. The left side was narrower than the right. It is not likely that the irregularity of the rugæ on the left side was independent of the fact that the lateral incisor and the second bicuspid were absent from the upper jaw, and that the second bicuspid on the same side of the lower jaw was also absent, its place being taken by the second milk molar, which had never been changed from the time of its eruption and was in all respects a normal, healthy tooth. The left side of the face was slightly smaller than the right.

In a girl of twelve years the rugæ were normal on the left, but on the right the sutural fold was forked and the remaining folds broken. On the left side the left second bicuspid tooth was absent, while on the right both teeth were in position.

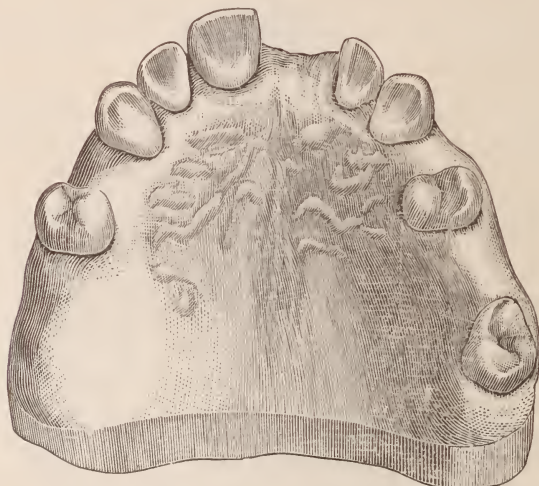
It is always of importance to remember that in the mouths of children in which the deciduous cuspids and molars are yet in position at a time when the permanent incisors and the first permanent molar have been erupted, the rugæ exhibit a disposition to approach one another toward these teeth. Is it possible that the change from the infantile arrangement where the folds are entire, regular, and symmetrical to that of the older child, where the acquired variations take place, is due either to the retention of the deciduous cuspids and molars, or to the retardation in development of the permanent bicuspid teeth?

The region of these teeth is an exceedingly active one within the maxilla, since the germs of the permanent cuspid and of the bicuspids are well advanced to completion. At the same time the periph-

eral structures are not changing in correspondence. Hence an element of disturbance is created.

*Clinical Applications.*—It is evident that if, as has been claimed, the rugæ are modified by nutritive and developmental processes, they will have clinical significance also. The application will be especially evident in the manner in which the rugæ are aborted by protrusion of the premaxillary elements, and of the hyperostosis of the structures at the raphé. When the vault is flat,—the rugæ tending to be symmetrical though feebly developed,—a condition is present which is often found associated with chronic nasal catarrh of the atrophic type. If the arch is wide the sides of the palate and the alveolar processes are not well developed, the rugæ are gathered in a clump upon an anterior declivity of low inclination, the turbinal scrolls are small, and the membranes non-erectile. The teeth in

FIG. 9.



The hard palate is without neck-folds, is of low arch and is wide. The raphé is nearly obliterated. The rugæ are broken. The lateral half of the third post-sutural fold extends obliquely forward and is in line with one of the median elements (probably of the second). No similar disposition is seen on the left. Lateral concrescence is seen on the left side.

such individuals are large, especially the incisors, the patient is predisposed to premature recession of the gums from about the necks of the teeth and to suppurative affections of their roots.\*

*The Incisive Pad.*—The pad is often of a bluish red color when the palate elsewhere is of a pale hue. At other times the pad is of pink color and the base surrounded by a deep blue line. Thus the pad may be congested either in whole or in part while the rest of the hard palate is entirely free. In a man fifty-six years of age from whom I had removed a number of polypi the pad was the seat of soreness and pain for a week after the operation. It constituted the only annoyance which followed upon an operation of exceptional extent. In children who have been operated upon for

\* For the connection between atrophic catarrh and premature recession of the gum see a paper by the author in DENTAL COSMOS, 1885, xxvii, 329.



deflected septum the necks of the teeth are surrounded by a purplish red line as long as the plug is worn in the nose.

*Absence of Rugæ.*—The rugæ may disappear by pressure from within, as from a nævus or a fibrous tumor, and from without, as from the pressure from a plate for artificial teeth. The absorption of the alveolar process after the extraction of teeth, as a rule, induces the absorption of the rugæ, but occasionally the rugæ persist and are found lying directly across the position of the former dental arch.

*Medico-Legal Value of the Rugæ.*—The persistence of the rugæ after death leads to the conclusion that they may afford valuable signs by which the body can be identified, for during the processes of decomposition the mucous membrane of the hard palate is among the last to be lost. When the positions of the rugæ are recorded (as in the event of a patient having been recently under the care of a dentist and the impression of the rugæ having been taken in plaster), it is certainly true that the folds could be used in connection with the teeth, or even in the absence of these organs, in identifying the subject.

*Congenital Syphilis.*—In congenital syphilis I have often observed that while the roof of the mouth, especially at the anterior part, was of a deep red color from inflammation, the rugæ were milk white. The folds become swollen and painful in acute inflammation of the roof of the mouth, and infiltrated in cases of prolonged suppuration from the alveolar processes.

In the diagnosis of syphilis this appearance is of importance. While the characters of the teeth as caused by scarlet fever may be much the same as those produced by syphilis, yet in the sequelæ of the disease first named the hard palate yields no characters. In syphilis more or less congestion if not inflammation appears to be constantly present.

The study presented in the foregoing pages is based entirely upon examinations made upon living subjects. Forms of mouths which occurred to me as interesting were selected, and casts of the rugæ and teeth taken in plaster with great care.\* The material therefore is not of the average. It is based upon the hard palates of individuals known to have some disease associated with disturbed states of secretion of the nasal chambers.

In order that the study should have a more extended application, it was thought to be desirable before any exact clinical conclusion could be drawn that a study of similar extent be based on material known to be derived from entirely healthy individuals.

To make such examinations I visited the State Eastern Penitentiary in this city, and by the courtesy of Dr. W. D. Robinson, the physician of the institution, was enabled to study the mouths and nasal chambers of the inmates. In this way ninety examinations were recorded.

In no instance was hyperostosis present in the form spoken of in the foregoing pages. Nor was a single case of hyperostosis of the roof of the mouth back of the region of the rugæ seen. In a word,

\* I desire in this connection to acknowledge my indebtedness to many of my friends, especially to Dr. L. Ashley Faight, Dr. E. C. Kirk, and Dr. J. M. McGrath. Dr. J. W. White and Dr. W. Storer How, of The S. S. White Dental Mfg. Co., also greatly aided me in the investigation.



no form of rugæ was detected which was broken by the descent of the median structures.

In twenty-one examples the raphé was sufficiently prominent to form a slight fullness which could be felt by the finger. The remaining fifty-eight examples were perfectly smooth.

The rugæ were very commonly of the form exhibited in Figs. 1 or 2, with a disposition for the folds to be con crescent at their outer ends. The examples of the left sutural rugæ deflected along the line of the raphé were but six in number; moderate degree of asymmetry of the sides of the roof in seven; con crescence of the right sutural and post-sutural as to form a fork-like figure in but three.

It is evident that the variations of the arrangement of the rugæ were within a much narrower range than in the ninety cases from subjects from other sources.

The roof of the mouth presented no narrowing of the vault with compression as seen in Fig. 8, and no flat wide palate as seen in Fig. 9. Thus the extremes of variation—viz, of the high, narrow vault and the low, wide vault—were absent. But one instance of a moderately compressed vault was seen, and in this example the pre-maxillæ were not thrown forward.

Respecting the presence of catarrhal affections in the cases, it is necessary to say that not a single man among the entire number examined had complained to Dr. Robinson of any of the symptoms of these diseases. I detected small quantities of secretion in the nasal pharynx in fifteen instances. I cannot admit that this circumstance had any significance in the absence of any of the usual appearances of the membranes.

The teeth and nasal chambers were also examined, but nothing found which is worthy of special mention.

*Conclusions.*—The following conclusions may be drawn from the statements made in the paper:

(1) That the range of variation in the roof of the mouth and its folds is greater in subjects of nasal catarrh than in those who are free from this disease.

(2) That the variations of the rugæ are different on the two sides of the roof.

(3) The excess of development of the pre-maxilla and the horizontal plate of the maxilla, especially at the anterior portion, constitutes a condition which is found in about fifty per cent. of cases of chronic nasal catarrh.

(4) That chronic nasal catarrh is found associated with so many phases of asymmetry of the rugæ of the hard palate and the dental arches that the disease should be studied as a morbid action which is based upon morphological elements and not alone upon climatic conditions.—*Harrison Allen, M.D., in Proceedings Academy of Natural Sciences, Philadelphia, September 25, 1888.*

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## ORIGINAL COMMUNICATIONS.

### DISEASE OF THE ANTRUM DUE TO DENTAL COMPLICATIONS, AND ITS TREATMENT.

BY FRANK ABBOTT, M.D., NEW YORK, N. Y.

(Read before the New York Odontological Society, November 20, 1888.)

MR. PRESIDENT AND GENTLEMEN: Antrum is a name given to certain cavities in bones, the openings into which are smaller than the cavities themselves. The antrum of Highmore was known in Galen's time, but it was not until 1651 that a rational description of it was given by Nathaniel Highmore, of Sherburne, England. It is a deep cavity in the substance of the superior maxillary bone, communicating with the middle meatus of the nose by an opening (in the recent state) about the size of an ordinary knitting-needle, through which the Schneiderian membrane is prolonged to line the cavity. It is called by anatomists an irregular triangular-shaped cavity. Its floor is formed by the alveolar process, and its roof by the floor of the orbit. Any further anatomical description of this cavity, at this time, would be superfluous, except in a few respects, which bear more directly upon the subject before us. The bony covering of the antrum is in several places extremely thin, so much so, that pressure produced upon it by excessive accumulations in the cavity causes it to bulge perceptibly, and unless it is early evacuated, perforation of these thin walls ensues. These localities are—(1) immediately above the canine fossa; (2) upon the buccal wall, above and between the roots of the first and second molars; (3) above and between the palatal roots of these molars; (4) the orbital floor.

A feature of no little interest and importance in studying the antrum, especially pathologically, is the variation in its situation. It has been said that in the examination of one hundred skulls, no two presented this cavity in precisely the same situation. Some

are large, some small, some are much higher than others, some well to the front, others set deep back, and in many instances its situation is very different in the same face, one side being very large, prominent, and high, while the other is the reverse.

If the face be short and broad, the indications are that the floor of the antrum is penetrated, or nearly so, by the roots of the first and second molars, and perhaps by that of the second bicuspid as well. As far as my observation has gone, the first bicuspid and canine seldom if ever penetrate the floor of this cavity with their roots.

*Physiology or Function.*—This, like the frontal sinuses, being connected with and forming a part of the air-passages, is made use of as a reservoir for air, which is kept at the temperature of the body; and in the act of inhalation this warm air becomes mixed with the cold, so that upon its entrance into the lungs it is slightly tempered. Again, as the cavity is lined with Schneiderian membrane, it undoubtedly serves to a limited extent to assist in the delights or otherwise attendant upon the use of the special sense of the nasal organ.

*Diseases.*—It is an undoubted fact that the great majority of the diseases of the antrum are due directly to dental complications. Many other diseases of the antrum, such as the different varieties of tumors and the “troubles common to mucous membrane wherever situated,” occur so rarely as compared with that in which the dental organs are especially responsible, that I am disposed to confine myself to the consideration of that alone, in this short paper.

It has been stated that to call this disease abscess of the antrum was a misnomer, from the fact that but for the close proximity of diseased teeth, such a disturbance would probably not have taken place. Recognizing the force of this argument, would it not be well to speak of it as an alveolar abscess, the pus from which finds exit into and through the antrum? By the presence of the pus, however, the entire mucous membrane lining the antral cavity often becomes inflamed and more or less hypertrophied, so that if of long standing a quite general ulceration takes place, and in some rare instances the soft tissue covering the bone in places is altogether destroyed, leaving the bone bare. Thus it becomes a disease of the mucous membrane lining the cavity itself; and for these reasons it has received the name of abscess of the antrum. Abscesses in this cavity are spoken of as arising from mal-positioned teeth. Undoubtedly such might be the case, but it has never been my privilege to see one.

*Diagnosis.*—The means of diagnosing an abscess of the antrum are quite numerous, and generally conclusive. The first symptom

of a disturbance which results in such a disease is a slight soreness of a tooth the pulp of which is lifeless; then follows a dull, heavy pain (sometimes sharp and darting up the side of the head) in that side of the face. This moderately increases in severity, for days, weeks, and sometimes for months, before any very especial notice is taken of it by the patient, when attention is directed to it more particularly by a decidedly heavy feeling and increased pain in the cheek upon bending forward, or in tipping the head from side to side. If the cavity becomes considerably filled with pus before the lining membrane becomes sufficiently inflamed and thickened to have closed the opening into the nose, an excessive discharge will be noticed from that organ upon the affected side. This discovery usually takes the patient to the family physician, who at once pronounces the disease catarrh or ozena, and proceeds in his treatment. This often continues for months, and perhaps for years, before the real disease is ascertained.

Should the lining membrane become inflamed and thickened sufficiently to close the opening into the nose, the cavity then becomes filled with pus, and in consequence of its continued augmentation pressure begins upon the surrounding walls. The inflammation, together with the pressure, causes absorption, or a melting down of the walls progressively until an exit for the pent-up pus is effected, unless professional relief is obtained. While this progressive destruction of the bony wall is going on, a decided bulging of it takes place in the localities above referred to. A prominence is observed by the side of the nose, over the molar teeth, and in the mouth, upon that side, while the orbit is pushed up and out to such an extent that the sight of the affected eye is considerably elevated above that of the other. By pressing with the thumb upon the prominence, by the side of the nose particularly, crepitation may very distinctly be heard. With the above diagnostic signs presenting, it is generally safe to conclude that an abscess in the antrum is the disease in question.

*Differential Diagnosis.*—In order to differentiate between catarrh, or ozena, and antral abscess, it should first be ascertained whether any pulpless teeth are in that side of the upper jaw, and a careful observation should be made as to the relative situation of the antrum. If pulpless teeth are found, and the face is short from the oral cavity to the orbit, the indications are strongly in favor of an abscess in the cavity of the antrum, even should no other especial diagnostic sign be present except the discharge from the nose. On the other hand, should no pulpless teeth be found, or, if present, the face be long between the orbit and oral cavity, indicating that the alveolar process is very thick between the floor of the antrum and the roots of the



teeth, it would indicate that no abscess in the antrum existed. The absence of pulpless teeth would make the evidence more conclusive.

*Prognosis.*—The prognosis in the majority of cases is favorable, and with careful treatment they will, within from three weeks to as many months, be entirely cured. There are conditions, however, which militate against a successful termination of the best-directed efforts. These are, in both sexes, in patients of advanced age, with a generally low physical condition; those of sedentary habits, poor digestion; and those suffering from chronic malarial poison or from some specific disease. In the female the period of cessation of the menses (change of life) is probably the most troublesome to combat the diseases of this cavity. Dr. J. L. Mewborn, of Memphis, Tenn., who has devoted much time to the study of these cases, has arrived at the conclusion that abscess from any cause located in the cavity of the antrum of a female, at or beyond the "climacteric period," is seldom if ever permanently cured. From his report of cases, I do not feel disposed to deny his position. However, the first case I ever treated, in the mouth of a lady, was a patient over fifty years of age. In the course of a month all discharge stopped, and the opening healed. I saw the lady frequently, and for some three years she had no pain or uneasiness to indicate that all was not well in that antrum. Finally, after about three and a half years, an abscess made its appearance again, accompanied with all the pains and generally disagreeable features attending the formation of the original one. When she applied to me I found a second bicuspid, which had been pulpless for many years, to be the exciting cause. This I at once removed, cleansed the antrum, and treated it for a few times, when the lady left the city; and I have never seen her since, now some eight or ten years. She is alive, however, and as far as I know she recovered from her antrum trouble the second time as promptly as she did the first; but, on the other hand, she may never have recovered, and this may be one of the cases which would go to prove Dr. Mewborn's position. In another case, which I saw first in consultation some three years ago, the patient being, I should judge, some forty-eight or fifty years of age, I made a careful examination of the antral cavity, and could find no necrosed bone, nor any condition that would preclude the possibility of a cure within a few weeks, or months at most. I did not see her again until about eight months ago, when she was brought to me by another practitioner. I then made another careful examination of her antrum, and found a territory of denuded bone, as large (as near as I could judge) as a five-cent silver piece, located at the upper posterior wall of the cavity. I advised as to treatment, and the patient went away. I have since, by request, examined this case, and now believe the bone

that was bare when I saw her eight months ago has been re-covered with the lining membrane of the cavity. The opening into the antrum from the oral cavity remains about the same; it is extremely small, however. One peculiar feature presented itself in connection with this case, which may be of interest, if not of use, to some one who may hear or read this. The lady complained of intense darting pains in that side of the face, either in or immediately under the skin. For some time I was unable to account for it, but finally it dawned upon me that probably the denuded and constantly irritated bone in the antrum was in contact with the infra-orbital nerve, or perhaps formed a portion of its immediate covering, so that the trunk of the nerve received the injury, which manifested itself at its terminal fibers upon the face. The treatment was consequently directed to allay the irritation of the trunk of the nerve, which gave relief. This is another case which might be cited to sustain Dr. Mewborn's position, as I believe now, after these years, and a great portion of the time under treatment by different dentists, it is still open. There appears to be no discharge of pus from it, however.

*Treatment.*—The treatment consists in first obtaining a sufficiently large, depending opening into the antrum to admit of its thorough exploration, the ready application of remedies, and its involuntary evacuation of all fluid substances. This is accomplished by, first, the removal of the offending tooth. This I know will be objected to by some, but I consider it, as a rule, by far the safest procedure. If the tooth so removed be the first or second molar, a sharp bur the size it is desired the opening should be placed into the socket of the anterior buccal root, and with an engine driven into the antrum, cutting all intercepting bone as it proceeds; then with lukewarm salt water the cavity is thoroughly washed out, using a spray syringe for the purpose. A most searching exploration of the cavity is now made with a probe, to ascertain whether any necrosis of the bony wall is present. If found, it should be removed. If none is found (as it seldom is), the treatment is proceeded with as follows: Should there be an unpleasant odor arising from it, it can be controlled by the use of a solution of permanganate of potash, two grains to one ounce of water. This is not strong enough to irritate the delicate lining membrane of the antrum, and will very effectually deodorize it. The cavity is then washed out as thoroughly as practicable with a solution of carbolic acid one to sixty-four. This again is not strong enough to irritate the delicate lining membrane of the cavity, but in this strength it is a most effective antiseptic. A solution of equal parts of Listerine and water is often found very efficacious as an antiseptic in the treatment of these cases; a saturated solution of boracic acid in warm water is also found of excellent service.

There is no doubt of the efficacy of bichloride of mercury as an antiseptic. I have tried it but once, however, when I used a solution of one to two thousand. This produced so much irritation that I have since confined myself to more mild applications. I have no doubt, however, that a preparation of one to five thousand might be used to good advantage. One feature which especially recommends it for use in the mouth is that it has no disagreeable taste nor smell. After washing the cavity with any one of the above remedies, I apply the same more effectually by means of the spray apparatus. As a stimulant, I use tincture of iodine, one drachm to an ounce of the carbolic solution. Here I wish to remark that my first idea of the use of a spray, as a more perfect means of medicating the antrum, was obtained from Dr. J. L. Mewborn, of Memphis, in 1884. He, however, uses the remedy warm, and applies it by means of a hand atomizer with a single jet. I use compressed air, with a pressure of thirty to forty-five pounds to the square inch, and a multiple spray. The pressure forces the remedy into every irregularity of mucous membrane, and the multiple spray reaches all parts of the cavity. This mode of applying remedies to the cavity of the antrum I consider of incalculable service in the successful treatment of many cases, and I cannot, nor do I think dentists in general can thank Dr. Mewborn enough for this valuable addition to their armamentarium for the treatment of this disease.

After thoroughly medicating as above described, means must be taken to prevent the opening from closing too rapidly. This is done by means of cotton wound upon a roughened bit of wood, or a bit from a whisk broom, as near as can be judged the size of the opening. This is dipped into carbolized oil of sweet almonds, one part of carbolic acid to fifteen of the oil, then placed in position, and tied with a bit of silk to an adjoining tooth. This treatment is followed up every day, and as soon as all signs of pus have disappeared the plug is each day made smaller, until the opening is closed entirely. I never use a drainage-tube. In order to test for the presence of pus, peroxide of hydrogen may sometimes be used to advantage.

In cases where from the history it is evident that a specific poison has to be combated, iodide of potassium is given in five-grain doses three times a day, and each day the dose is increased one grain until the patient becomes perceptibly affected by it, which will be manifested by a decrease, and finally a cessation of the discharge of pus. Many cases yield readily to the effect of sulphide of calcium, given in one-tenth grain doses three times a day.

It is frequently the case that patients are anemic, consequently the disease yields slowly, if at all, to local treatment. In such cases ammonio-citrate of iron, in from five- to ten-grain doses, three times



a day, is found of excellent service. Quinine sulphate in two-grain doses, three times a day, is found useful. Persons who take very little out-door exercise, especially if past middle age, should be directed to take such exercise liberally and systematically every day.

It will be observed that I have spoken of but one means of gaining an entrance to the antrum. Other modes are adopted by some surgeons, some of which I do not approve of. Some three years since, I had the pleasure of listening to the description of an operation for this purpose, and saw the patient upon whom the operation had been performed. It was before this society, at its first meeting, I think, in this room. It consisted in making an incision from the corner of the mouth back past the external antral wall, dissecting the soft tissues from the wall, and making an opening into the antrum over the molar teeth. It was spoken of as a great and very successful operation. This may have been, as far as the cure of the disease was concerned; but it seems to me that the means adopted were altogether too heroic and not at all necessary. Here was, from the history of the case, a simple abscess, from a pulpless tooth, emptying into the antrum, which would have been treated, and probably cured, in a few weeks by a competent dental surgeon, with no surgical work whatever except the removal of the offending tooth and the enlarging of one of the sockets. In my judgment, as dental surgeons we ought to openly discourage, in the strongest manner possible, such uncalled-for surgical work as was shown in this case. Patients suffer quite enough at the hands of us all, when such work is done in the most conservative manner possible.

A most interesting and instructive case came under my observation some three years ago. A gentleman some thirty-five years previously received a scratch on the cheek, by the left side of the nose, which, despite all the efforts of the best-skilled physicians in this country and Europe, would not heal. It was pronounced a rodent ulcer, or flat cancer. It increased in size and annoyance very slowly indeed, so much so that at times it was thought to be more or less under control. Some twenty years before I saw him professionally, he had had the pulp destroyed in the left upper second molar, and the tooth filled in Paris. Some ten years later, his dentist in this city had refilled the cavity in the crown of the tooth, but had done nothing with the roots, they seeming to be filled satisfactorily, no trouble having been experienced from them. Three years ago the past summer the face on that side commenced to swell; the eye became pushed up very considerably, causing severe and constant pain. After his return to the city, I was requested to go and see him. Upon examination, I concluded that the pulpless



molar had caused an abscess in the antrum. I was requested by his dentist and attending physician to remove the tooth. This I did, and found my diagnosis correct. Immediately upon its removal quite a discharge of black, fetid matter was observed. This kept up during the following night and a part of the next day. Upon probing the antrum, it was found nearly filled with a mass, which proved to be cancerous. From this time forward the growth of the cancer was very rapid. In a few months' time I had removed all the teeth in the upper jaw, and several operations had been performed, when large masses of the growth were removed, to prevent suffocation. Death relieved him of his sufferings finally. The lesson to be learned from this case is this: where an incurable disease is present upon the face, great care should be taken that the dental organs are not allowed to become an auxiliary in its progress, thus increasing, to a great extent, the sufferings of the patient, and, in consequence, very considerably shortening his life. In this case the seat of the disease was apparently changed from his face, outside, to the antrum, caused undoubtedly by this pulpless molar. Its more rapid development, and consequent increase of suffering and shortening of his life, was the result.

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## THE EARLY DIAGNOSIS AND TREATMENT OF TUMORS OF THE JAW.

BY NATHAN JACOBSON, M.D.,

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(Read at the Union Convention of the Fifth, Sixth, Seventh, and Eighth District Dental Societies of the State of New York, at Syracuse, N. Y., October 25, 1888.)

IN accepting the invitation of your business committee to present a paper at this meeting, I welcome the thought of a closer relationship between our professions. At first, however, I regretted the selection of the topic made for me, thinking that there might be others of broader interest to us both. And yet upon reconsideration I am convinced that no subject will illustrate better our interdependence. For in the origin of these tumors the teeth play a most important rôle, sometimes because of their immaturity and again because of their decay. Moreover, the dentist often is the first to see these growths. The study of them in their earliest stages is frequently necessary to establish their character, while many times early appreciation of their true nature is of vital importance.

Tumor simply signifies swelling. Yet in referring to the swellings usually characterized as tumors, we have in mind distinct localized growths. The numerous classifications of tumors found in various

surgical works do not concern us at the present time. For our purpose we are interested particularly in the ultimate course, the destiny, of these growths. For this reason we will consider them from the stand-point of their innocence or malignity. Occurring in the jaw it is safe to say that a tumor which, by its local and general disturbance, can endanger life is malignant.

It is unfortunate that all surgical writers are not even agreed as to the malignity of various tumors. You will find in most text-books tumors described as innocent, malignant, and semi-malignant. To the first class belong all those tumors which are capable of creating only local disturbances. There exists for some reason an excessive growth of tissues very like those of the affected part. For example, there may be a localized growth of bone, an osteoma; of cartilage, a chondroma; of fibrous tissue, a fibroma, and so on. These tumors imitate exactly the type of tissues from which they grow. They do not produce any serious changes in the surrounding tissues, except from pressure or tension. They do not impress the system unfavorably excepting as they are annoying. They may interfere by location with proper mastication or deglutition, but beyond this they are harmless.

On the other hand we have tumors which are not content with simply occupying a part in the jaw, but grow into the surrounding structures. They do not merely crowd the tissues before them, but saturate them with their poisonous elements, invade them, destroy them, and, not content with local destruction, disseminate their infection through the blood, setting up equally infectious tumors in the lungs, the liver, and other parts of the body, until the patient, yielding to their exhausting influence, succumbs.

As cases present themselves to us, we have all grades of infectious tumors. Some grow rapidly, and without much loss of time lead to horrible ravages locally and early general infection. Others grow slowly, take years to accomplish the same end; but all kill.

The term "semi-malignant tumor" is misleading. Such a thing as semi-malignancy is not encountered in practice. There may not be rapid destruction or violent invasion of surrounding structures, but the step is in that direction. It is death ultimately, but slower death. You will find, in surgical text-books, cancers classed as malignant tumors, but under the head of "semi-malignant" you will find the tumor known as the sarcoma. The word signifies flesh. But these tumors are by no means made of muscle, yet they are constituted of exactly the same kind of cells that make muscle and other similar tissues in embryo: what we call embryonic connective-tissue cells.

We have three kinds of sarcomata. In one the cells are round,

in another they are oat-shaped and called spindle-cells, and in the third they are irregularly round but very large, containing several small-cell structures in their interior, and are called giant-cells. Despite the fact that the sarcoma is spoken of as semi-malignant, the round-celled is equally if not more malignant than cancer, and the spindle-cell may exhibit most malignant attributes. The giant-celled is the most innocent. It is apparent, therefore, that we can speak of tumors as being either innocent or malignant, the degree of their malignancy being of secondary importance. Another important distinction is evident in the result of treatment. The innocent tumors, once thoroughly removed, do not return. Not so the malignant. Their microscopic cells force an entrance so far beyond a point apparent to the naked eye that many times after their most generous removal we find them recurring.

We no longer speak of cancer as being inherited, or as the local expression of a bad blood condition. In its incipiency, cancer is a local disease. The poison has not pre-existed in the blood, but at a later date is carried into it from some local site where a malignant tumor has formed. It will not be possible in the brief space of time I intend to occupy to enter into a consideration of the peculiar features each form of tumor manifests. It will be sufficient to point out to you the distinguishing features between innocent and malignant tumors, to study their causes, to emphasize the need of an early appreciation of their character and the necessity of their early treatment.

Before entering further into this study, it is necessary to say that many of these tumors find their origin in the diseased conditions of the gums, which secondarily invade the jaw; others primarily located in the upper jaw may be developed in the body of the bone, in the alveolar or palate processes as well as from the posterior aspect. Occurring in these different sites their course differs widely. The latter forms we can dismiss without further reference.

Moreover, owing to the different relations of the two bones to their surrounding parts, there is the greatest difference in the course of malignant tumors originating in the upper and lower jaws. First let us consider tumors in the light of their location. The gums may be subject to a general thickening,—hypertrophy. True hypertrophy, however, springs from the periosteum of the alveolar process, and while therefore simple enlargement may be evident, the condition yields permanently to nothing short of the removal of the alveolus. There may occur limited hypertrophy, due to the pressure of poorly-fitting artificial teeth, especially in elderly people, for at their time of life tissues respond quickly to any irritation. On other occasions we will find innocent tumors springing up between two



teeth with very thin necks and bulbous ends. These are polyps, and can be very easily removed by wire loop or cautery. I have had a lady under observation during three pregnancies: each time there appeared a series of well-defined tumors sprouting between the teeth along the whole free border of the gums, bleeding freely upon slight irritation. These vascular tumors could be readily tied off or even removed with the finger-nail. The hemorrhage occasioned by the latter procedure is readily checked with a mild astringent. These are the mildest forms of disease of the gum. A more serious affection is epulis.

We encounter two kinds, one firm, the other soft. The firm growth presents a dense structure, which, however, is not homogeneous throughout: it is firmly connected with the alveolar border of the jaw, springing indeed from the very covering of the bone, the periosteum. Not only will there be found a growth of bone at the base of the tumor, but small, independent collections of bone will be recognized in its different parts. This tendency to organization into bone is peculiar to sarcoma, and is one of the essential characteristics of this kind of tumor-formation. The soft epulis is more vascular; it contains little firm tissue, but plenty of large giant-cells, and is very succulent; it breaks down readily and ulcerates, assuming a very angry, malignant appearance, strongly suggesting cancer. It is impossible to outline the extent of invasion into the jaw occasioned by these tumors. In their very beginning they are so intimately associated with the bone that at no time is it possible to say that they are absolutely gum-tumors. This very fact marks their malignity. It is this unrestricted growth that is typical of malignant tumors. You cannot define their outline; they present neither a well-defined neck nor border; they may occasionally strongly simulate innocent tumors by apparently exhibiting a slender pedicle. But the surgeon soon finds that their removal down to the bone without including the periosteum is followed by a new growth from the same site.

Epulis is excited into growth as a result of the irritation of decayed teeth or retained stumps. It is said that they are encountered more frequently in women than in men. Heath seeks to account for this in the fact that women will shrink from operative interference oftener, but will bear pain like toothache longer than men. Pregnancy and lactation will often prevent the removal of these sources of irritation.

Left to itself, epulis may attain great size and occasion considerable deformity. Despite the fact that the word epulis signifies only a growth upon the gum, it is necessary that we appreciate the fact that it is a growth which always implicates the jaw. Its non-removal, therefore, down to the jaw is useless; it is sure to crop out



again. Even more of the jaw than may appear to be implicated should always be removed. For this purpose I believe a strong Liston bone-forceps is the best instrument. Free bleeding usually follows, which can be most effectually controlled by the Paquelin thermo-cautery. The operations calculated to simply scrape away or gouge out an affected surface are not sufficiently radical. When dealing with a tumor of malignant character better remove too much than not enough of the suspected tissues. A tumor bearing a striking resemblance to epulis is sometimes found upon the hard palate. It possesses likewise malignant attributes, and should receive summary treatment. This early active treatment of epulis is usually most satisfactory. Of twenty-eight cases collected by Heath only one died, and this was the result of blood-poisoning. All the others were permanently cured. The ages of the patients ranged from nine to seventy-three years.

Nearly three years ago there was removed at St. Joseph's Hospital, in this city, the upper jaw of a man for an epulis which through neglect had already invaded not only the alveolar process, but the whole body of the bone. The floor of the orbit was saved. He has remained thoroughly well since, and the loss of the jaw is certainly not apparent in any deformity of the face. The tumor was of the soft ulcerating kind, and it is particularly this variety which demands extensive removal of tissues.

A more serious affection of the gums appears in a much more innocent garb, apparently a mere ulcer. You gentlemen of the dental profession are much more apt to encounter it in its early stages than are surgeons. A sore appears, perhaps awakened by a carious tooth; it does not heal kindly, but exhibits a tendency to extend; its borders become hard and thick; its base soon adheres to the bone beneath. This is cancer.

Bone is never primarily the seat of cancer. When this broad assertion was first made, twenty years ago, by earnest German pathologists, cancers of the upper jaw were held up as positively disproving any such statement. But we know now that there are but two locations in the upper jaw in which cancer ever is encountered. The first begins as above indicated upon the gum, the second in that cavity of the body of the upper jaw known as the antrum of Highmore. Covering the gum is a thin mucous membrane, lining the antrum is a similar coating. It is in this tissue that the cancer begins to grow, not in the bone itself. In each case it starts not as a distinct tumor, but as an ulcer, which eats its way into the bone. Upon the gum the sore forms, and by its thickened edges and firm, immovable base shows its malignant, infiltrating features. Dental surgeons cannot have this too strongly impressed upon them. When

a recent ulceration of the gums shows no inclination to heal in a week or ten days, it should receive surgical attention. Neglected, we must anticipate bone-invasion. This invasion becomes further evident in the loosening of the teeth. At this juncture a radical operation is quite certain to be successful. We must again cut wide of the diseased surface and be thorough in the eradication of the affection. This variety of cancer corresponds to those generally known as "skin cancers," and rarely recurs after proper removal.

Just here it would be wise to consider cancer as it originates in the antrum. As previously remarked, cancer of the jaw in its beginning does not manifest any swelling; its growth in the antrum particularly illustrates this fact. Long before any swelling appears in the face, the disease has not only undermined the maxilla, but spread in every possible direction. In a person of advanced years there appears, perhaps, violent toothache. A decayed tooth or stump is removed. From the resulting cavity pus begins to discharge, the toothache is unrelieved. The dentist may pass a probe up this sinus into the antrum, and, discovering a softened mass or some dead bone, believe he has before him a case of necrosis. If the removed root has been carefully examined a soft growth (proud flesh you would term it) may be seen attached to it. After a time some of this same fungous tissue forces its way out of the socket from which the tooth has been removed, or perchance, by this time, fistulous openings have appeared upon the hard palate or in the nostrils, through which fetid pus is discharged. Here also fungous masses protrude.

Küster, of Berlin, calls attention to another train of symptoms which he has observed. In connection with severe toothache and pain in the jaw, assuming usually the form of trigeminal neuralgia, there has occurred persistent nose-bleed not accounted for by any existing nasal disease. He believes the joint appearance of these symptoms, though there be no external evidence of swelling, justifies us in making an exploratory incision down to and into the bone. He has never failed to find it softened and in a state of cancerous degeneration. Whitmarsh reports a case where the fungous mass was first evident in the nares. It was accompanied by profuse nasal discharge. Cancerous degeneration had led to extensive necrosis, which was recognized by examination; but the true nature of the disease was not evident until revealed at the post-mortem examination.

It appears from these various symptoms that cancer of the body of the upper jaw conceals its true nature in the beginning, progresses insidiously, and except by the watchful eye is not recognized until it has led to extensive destruction of bone, has opened perhaps into the cavities of mouth, nose, and orbit, and has possibly extended,

even within a few weeks, beyond operative relief. Butlin has removed the upper jaw within seven weeks of the first manifestation of disease, only to find the bone entirely destroyed and sinuses burrowing into all the neighboring muscles.

Under these circumstances it is evident that the most thorough removal of the upper jaw is totally inadequate to control the disease, if it has already advanced so that it can be recognized by external indications. Our only safety lies in the very early removal of the entire jaw, before the disease has extended to any appreciable extent.

To disclose the existence of a malignant disease which so cunningly conceals its presence, it is evidently necessary to examine not only the mouth, but the nose, the orbit, and indeed even the throat. It will require the combined efforts of dentist and surgeon. The dentist will find the suggestion of Heath most valuable, that the attachment of any growth to the roots of extracted teeth should excite suspicion of the presence of serious disease of the antrum. Any such mass should be subjected to microscopical examination to determine its character.

The innocent tumors of the jaw may be hollow or solid; the hollow growths are known as cysts. Dependent upon their site and their manner of formation, we have simple, dentigerous, and multilocular cysts. The simple cyst is connected with the root of a fully-developed tooth. It may be so small as not to awaken even the suspicion of its existence. When it attains greater size it is recognized by its slow growth, its localized character, and particularly by its gradually thinning covering, which at last is so attenuated that it crackles under the slight pressure of the finger; it is painless. Dupuytren thought that these cysts were more frequently connected with the upper canines than with any other teeth.

The dentigerous cyst is awakened by the irritation of an undeveloped tooth. Because of misplacement, inversion, or other reason, these teeth do not attain their maturity. The localized expansion of the jaw which they occasion exhibits no marked characteristics to distinguish it from a simple cyst. It is often even difficult to diagnose it from a solid tumor, until with time the walls grow thin and bend under pressure, and there is finally absorption of the bone. Search of course is to be made for any absent teeth. Yet it must not be forgotten that occasionally supernumerary teeth are responsible for these cysts. Simple incision into the cyst-wall to evacuate the fluid contents will not effect a cure; it usually closes again speedily. It is necessary to remove a part or the whole of the anterior wall and allow the cavity to fill up with granulations; after incision and



removal of the irritating tooth, sometimes pressure upon the walls of a dentigerous cyst will effect a cure.

Multilocular cysts (Mr. Eve argues in the *British Medical Journal*, January 6, 1883) are not of dental origin, but are due to an ingrowth of the epithelium covering the gum. However this may be, carious teeth are usually responsible for this perverted action. They are located usually in the lower jaw and attain great size. As their name implies, they are composed of a collection of cysts. These are separated from each other by firm structures. The cysts contain fluid of varying consistence, their outline is well defined.

A patient operated upon by me eight years ago was afflicted with a tumor of more than ten years' growth. It involved nearly one-half of the lower jaw and extended well back to the pharynx. Some of the cysts had ulcerated through the cheek. After making an incision along the lower border of the jaw from the ear to the chin, I cut through the maxilla with a chain saw at a point corresponding to the left central incisor, and again through the ascending ramus, being able to preserve the temporo-maxillary articulation. There has been no recurrence. Fibrous tissue filled in the space made vacant by the removal of the tumor, and an artificial jaw and teeth have restored the face to its almost normal contour; not even a scar exists.

The solid outgrowths of bone and cartilage are recognized by their slow growth, their extreme hardness, freedom from pain, and well-defined margins. Their removal requires only their section with the saw at the point of attachment to the bone. No recurrence is to be feared. Sometimes, however, cartilaginous tumors grow between the plates of the lower jaw. Some authors make a distinction between them and the sarcomata. The profession is divided upon this point.

A consideration first of sarcoma will render more clear the reasons for this difficulty of diagnosis. While cancer can only grow from a surface covered or lined with skin or its substitute epithelium, sarcoma can originate in any connective-tissue structure. To this class belong bone, muscle, tendon, and, in fact, as far as the jaws are concerned, every part but the thin membrane which covers the surface of the gums or lines the cavities of the upper jaw. It is evident then that sarcoma can spring from any part of the jaws proper. In fact, all malignant tumors which originate in the jaws themselves are sarcomata. Reference has been made to the different varieties of this tumor, but further classification is necessary. When in the lower jaw sarcoma is superficial, it is spoken of as subperiosteal; when deep—that is, between the two layers of the bone—it is central. I have referred to one form of superficial sar-



coma, the epulis. Originating in the body of the superior maxilla, the disease is of a most malignant type. Many times an injury is responsible for the development of sarcoma. The blow excites into active growth the cells of which the part is made.

If as they are multiplied the cells become the counterpart of the tissue excited into growth,—if for example in bone, cartilage, or fibrous tissue they are reproduced as the fully-matured type of these tissues,—we have tumors which are truly osseous, cartilaginous, or fibrous. If instead of this the cells do not mature, they remain in their embryonic state; this immature embryonic tissue-growth is sarcoma. Parts of the tumor may mature, and so at some points there will be collections of bone, cartilage, or fibrous structures. In some this organization into fiber is marked and the tumor is quite hard, in others the cells are of the most embryonic type, and the consequent growth is soft. It must therefore be apparent that under the term sarcoma we group tumors possessing the widest differences. Many of them have nothing in common, either in color, texture, or consistence. In fact, they cannot be distinguished in this way. What marks their malignity is their invasion into the surrounding structures. In other words, they do not possess merely a broad attachment, but penetrate into the neighboring parts.

Occurring in the body of the upper jaw, a slight fullness will appear in the cheek, over the antrum. Examining the mouth, a growth may be seen to overhang the canine and bicuspid teeth. It is usually elastic and has occasioned a great deal of pain. The lower eyelid is puffy, the nasal duct may be closed by pressure, and tears may overflow upon the cheek. The veins of the face may be enlarged, but none of the glands will show any increase in size; the integument is not discolored.

In September, 1887, I removed the upper jaw of a lady of advanced years, who five years prior had fallen down a cellar stair. The growth was slow, had not attained great size, but despite its apparent innocence possessed all of the above-mentioned characteristics. What particularly impressed me with its malignity was the fact that it seemed to involve the whole jaw, for I could not outline it.

An incision was made through the center of the upper lip, around the nose and up its side as high as the nasal bone. From here the incision was carried horizontally under the lower eyelid to the malar bone. With a bone-forceps the malar, palate, and nasal processes were severed. When I attempted, however, to remove the bone, it crumbled under the pressure of the forceps. Despite its apparently small size, it was now evident that the whole body of the bone, including the floor of the orbit, was diseased. However, the diseased mass was cleared out and the flaps of the skin brought together.

Union was prompt; there was scarcely a scar to mark the line the knife had made. In the mouth repair went on undisturbed, no fever, no pain, no hemorrhage. In six weeks' time everything was healed over. But—and unfortunately in this class of cases there generally is a “but”—the growth speedily recurred, and in such a malignant form that it exhausted the poor woman and death was a relief.

In the lower jaw, sarcoma may spring either from the surface or from the interior of the bone. The superficial subperiosteal sarcomata are more or less organized into fiber, cartilage, or bone. They usually involve the body of the bone, grow quickly, attain great size, spread into muscles, recur speedily after removal, when they ulcerate and are soon followed by infectious tumors of other bones, lungs, or liver. The lower jaw more frequently than any other bone is the seat of central sarcoma. These remain shut up between the plates of the bone for years, and are not inclined to infiltrate the surrounding parts like the other variety. This is the class which bears the striking resemblance to the innocent central cartilaginous growths before mentioned. These sarcomata are more innocent than the superficial ones.

Sarcoma is usually a disease of early life. More frequently than any other tumor it results from injury. Carious teeth and any other form of irritation may be its cause.

It is evident from what has been said that the border-line between these various connective-tissue tumors cannot be drawn with anything like precision. There may be in a single tumor all stages of development of tissue; in others there may be only evidence of immature, or again of fully matured growth. With this condition existing, it must be clear why I have hesitated to distinguish between these tumors. But in a general way, rapidity of growth, softness of texture, invasion of surrounding structures, tendency to break down and ulcerate, great pain, all lead us to infer that we are dealing with malignant disease.

These tumors are all, however, primarily local. In other words, there is a time in the history of each of them when perfect removal can be accomplished. Their early recognition is most essential, and their speedy removal must follow.

In the removal of these tumors, the danger of their infecting tissues far beyond recognition by the naked eye must not be forgotten. To effect their most thorough removal, to make our work radical, is the problem before us. Early, thorough removal is the motto. It is not only a question which method will least disfigure, but how we can reach every diseased point. We must cut wide of the disease if we can, and we can if the operation is done early. In

some cases no external incision may be required, in others the opening must be as free as possible. Each case becomes a law unto itself. However, it is remarkable that even the most generous removal of either the upper or lower jaw creates but little disfigurement. Every one who has seen these cases becomes impressed with this fact.

But I am exceeding greatly the time I intended. I am aware that the study of these tumors is beset with many difficulties, and that an exposé of them, in language intelligible but not too technical, is even a greater task. I trust that I have made myself clear; and yet, if I have not, I can only feel that it illustrates again the necessity of greater communion in work between dentist and surgeon.

## ETIOLOGY OF IRREGULARITIES OF THE JAWS AND TEETH.\*

BY EUGENE S. TALBOT, M.D., D.D.S., CHICAGO, ILL.

### VIII.

#### THE ORIGIN AND DEVELOPMENT OF THE V- AND SADDLE-SHAPED ARCHES AND KINDRED IRREGULARITIES OF THE TEETH. (*Concluded.*)

THE lower jaw never assumes the V-shape when the teeth articulate normally. That is because the anterior inferior teeth normally close inside of the upper teeth, and, while the force from improper occlusion of the jaws and the forward movement of the posterior lower teeth is as great or greater than the like force exerted upon the upper jaw, the forward movement of the central incisors is prevented by the striking of their anterior surfaces against the posterior surfaces of the superior incisors. There are many irregularities of the anterior inferior teeth caused by the forward pressure of the posterior teeth. Those are quite difficult to regulate, owing to their intimate relations with the superior incisors. The inferior dental arch should be divided into the right and left lateral arches, corresponding to those of the superior arch. The pressure produced by improper articulation and the forward movement of the posterior columns (the bicuspid and molars) is exerted on each lateral half independently, like that in the lateral arches of the upper jaw. Each lateral arch on the lower jaw has its posterior base (the first permanent molar), an anterior base (the central incisor), and the same number of stones in position upon the bases,—the same keystone,—all representing the same number of teeth as are contained in the superior lateral arches. The development of each inferior

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lateral arch is independent of the others, as is the case with the superior lateral arches. The irregularities of the teeth in each lateral arch are independent of the others. When the posterior column moves forward, if the key-stone (the cuspid tooth) is retarded or slow in coming into place, the space is filled by the first bicuspid and the cuspid remains outside, precisely as in the superior lateral arches. If the pressure of the posterior columns and the key-stone is uniform, the force will be exerted against the anterior base and the first stone upon the base (the central and lateral incisor). In this case a different condition exists. The anterior base and first stone of the superior lateral arch, and the anterior inferior column, resist the force. Occasionally, this is so great that the anterior columns of both superior and inferior dental arches are carried forward. When this occurs, the incisors upon the upper jaw protrude. When the forward movement of the posterior column occurs, the incisors (or anterior column) will crowd past one another like the sticks of a fan, provided the pressure be uniform

FIG. 1.

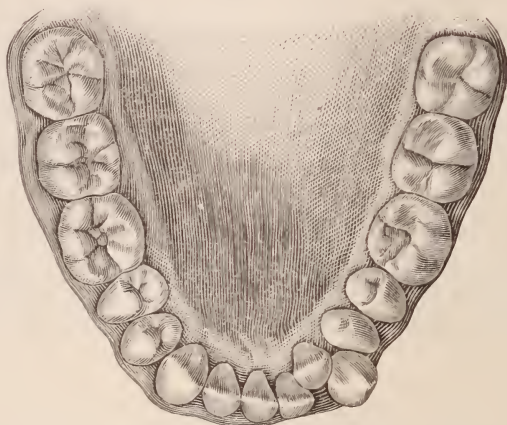


in both lateral arches. If the pressure is upon one side only, the irregularity will be located on that side. One of the common irregularities is seen when the key-stone or cuspid tooth is slow in erupting. The posterior column moves forward and the resistance of the anterior column forces the key-stone outside the arch. It sometimes happens that the key-stone moves into place and is held in position by the anterior column, and the second stone upon the posterior column (the first bicuspid) is carried forward outside the arch. This theory can be better understood by examining cases of this kind which are found in my models of the jaws and teeth, and which will be illustrated later. It may be well first to glance at Fig. 1, which shows in position a section of the teeth made on the line of lateral antagonisms. While this drawing is intended to show a section of the teeth on the superior jaw, it will answer also to show the relative relations of the lower teeth. It will be observed that the mesial and distal surfaces are convex, and the points of



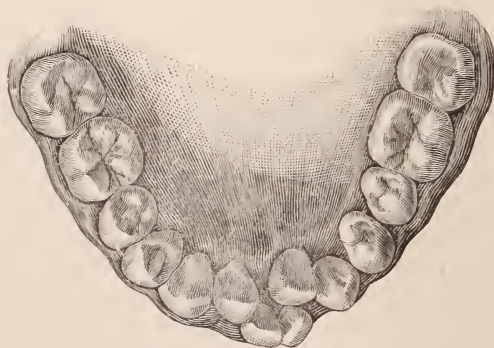
contact are situated at the extreme lateral surfaces. If the teeth at eruption should not touch at these particular points, or if the force exerted should not be in direct line with these points of contact, the teeth would be situated upon an incline, and the force thus applied would readily carry the teeth one way or the other. Such deformi-

FIG. 2.



ties occur more frequently with the incisor and cuspid than with the posterior teeth. The posterior teeth are held in position by their contact with the occluding teeth of the opposite jaw, while the incisors do not occlude. One marked feature of these irregularities is that in most cases the lateral incisor is carried inward and the

FIG. 3.



centrals outward to remain in position in one or both lateral arches. Fig. 2 shows the right dental arch as normal. In the left dental arch the anterior column with the cuspid (the key-stone) have moved forward, and the lateral incisor is carried inward. This is explained when the relation between the mesial surface of the cuspid

and the distal surface of the lateral is understood. In the forward movement of the cuspid the lateral impinges upon a markedly inclined plane upon the mesial surface of the cuspid, and the forward pressure carries the lateral inward. Fig. 3 shows the same irregularity in both right and left lateral arches, the pressure being uniform upon each arch. The centrals are also slightly rotated in their sockets. This is produced by the flat lateral surfaces of the roots meeting and the pressure of the crowns against the basilar ridges of the superior centrals. Fig. 4 shows the left inferior dental arch in a normal condition, which may be accounted for by two reasons. First. Lack of anterior pressure. Second. Perfect occlusion with the upper teeth, which holds the lower teeth in position. The occlusion of the right inferior dental arch has been very imperfect, and the posterior pressure very great, producing a decided forward

FIG. 4.

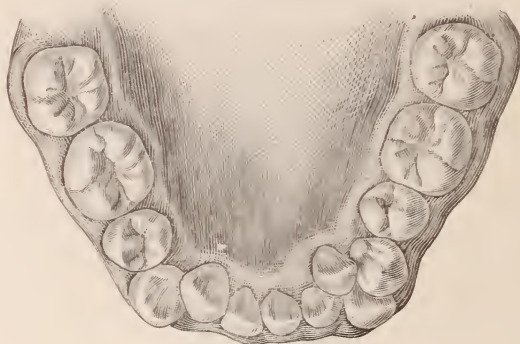


movement. The right central and lateral incisors have been slightly rotated in their sockets, and the cuspid has been carried forward and outside the arch,—a very common irregularity. When we consider the peculiar forward tendency of the teeth, the retention in position of the inferior incisor by the superior incisors, the weakness of the outer plate of the anterior alveolar process, it is surprising that the cuspids take a normal position.

Fig. 5 illustrates the lower jaw and teeth of a girl thirteen years of age. This irregularity is remarkably extensive. The teeth upon the upper jaw are, with the exception of the right cuspid, quite regular. This tooth protruded, owing to the malposition of the first bicuspid upon the lower jaw. Both lateral arches upon the lower jaw show a decided irregularity in the anterior part of the mouth, although the jaws and arches are sufficiently large for the teeth. The crowded condition is not due to lack of harmony between the teeth and alveolar process, it is owing to a forward movement of the posterior teeth,

that is partially due to inharmonious development of the jaws. The teeth in the left lateral arch have moved forward, the incline upon the anterior surface of the cuspid has carried the lateral incisor inward, and the cuspid has been forced forward until it stands entirely outside the arch. The forward movement of the posterior teeth is only checked by the first bicuspid wedging itself between the cuspid and lateral incisor, which are kept in position by the incisors and cuspid of the right side. The forward movement of the posterior teeth in the right lateral arch has carried the right central incisors past the median line. The right lateral and cuspid are in the position of the central and lateral incisor. These teeth are held in position by the incisors upon the upper jaw. The first bicuspid is forced against the external inclination of the cuspid tooth and carried outward and forward, so that it is on a line with the cuspid

FIG. 5.



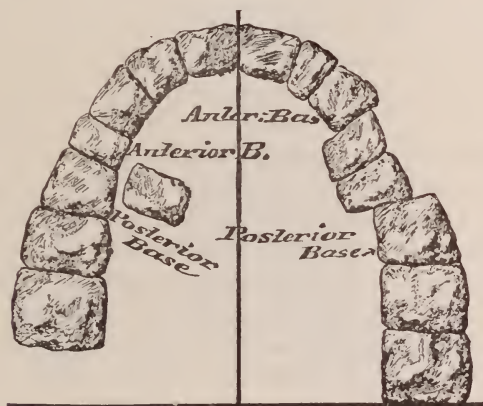
of the opposite side. The teeth are dense and hard for so young a person, and the roots are long and situated in a very thin, narrow alveolar process.

#### THE SADDLE-SHAPED ARCH.

The saddle-shaped arch is not so common a deformity as the V-shaped. It has many of the peculiarities, however, that are seen in the V-shaped arch. It may include one or both lateral arches. It may be partial on one side and marked upon the other. It may involve the bicuspid and first permanent molars upon one side, or but a single tooth on the other. Each lateral arch produces its own deformity independently of the other. The roof of the mouth may be high or low. The deformity, like the V-shaped arch, is favored by the high arch. The following illustration (Fig. 6) shows the manner of the production of this deformity. We see here a right and left superior lateral arch of stone, each stone corresponding in size and location to the natural teeth. The left

lateral stone arch, corresponding to the left superior dental arch, shows the formation of the saddle-shaped arch and the order of laying the stones and changing the base. The first stone laid in the arch corresponds to the first permanent molar, and, like the stone in the V-shaped arch, is denominated the posterior base. The next stone laid corresponds to the central incisor, then the stone which stands for the lateral incisor. The natural order then changes, and the next stone laid corresponds to the key-stone of the V-shaped arch (the cuspid). It becomes the anterior base, forming a fixed point in the anterior part of the mouth. The next stone laid corresponds to the first bicuspid, followed by those representing the second bicuspid and the second and third molars. The stones being in position, we find that the anterior and posterior columns

FIG. 6.



are nearly equal in strength and resisting power. The anterior column is made up of the anterior base (the cuspid), with its long root, backed up by two foundation-stones representing the central and lateral incisors. The posterior column is made up of its base, the first permanent molar backed by two foundation-stones, representing the second and third molars. The forward movement of the posterior column takes place in the arch from the same causes which produce the forward movement in the V-shaped arch. The stone representing the cuspid is not the stone involved; it is almost always fixed in its proper place. The weaker stones are those which correspond to the bicuspids, and they are the stones which are always displaced when the forward movement of the posterior column occurs. The change in the order of the laying of the stones—*i.e.*, the stones corresponding to the cuspid instead of the bicuspid, (it being irregular)—accounts for there being fewer saddle- than



V-shaped arches. The change of the anterior base will also explain why the anterior column and alveolar process do not project, as in the case of the V-shaped arch. The right superior lateral arch illustrates another common variety of the saddle-shaped arch. It does not differ materially from the left lateral arch as regards the order of laying the stones. The anterior base is transferred one stone back, the stone corresponding to the first bicuspid. The posterior base remains the same. The posterior column moves forward and carries the stone representing the second bicuspid inwards. By comparing the shapes of the natural teeth with the stones in the arch just described, we shall observe that the approximate surfaces are convex instead of flat like those in the stone arch just described. The peculiar incline of the anterior surface of the first permanent molar and the posterior surface of the cuspid tooth, together with the oval shapes of the bicuspids, are singularly well adapted to cause these irregularities upon the application of force. The first permanent molars are situated farther outside in the arch than any teeth posterior to them. The cuspids occupying such a prominent position in the arch, in the anterior part of the mouth, the least deviation inward of the bicuspids would give the pinched appearance of the jaw at that locality. This deformity is caused also by the too early extraction of temporary molars, which allows the first permanent molars to work forward and force the bicuspids inwards, or by the retention of the temporary molars or their roots, thus deflecting the crowns of the bicuspids. The question arises, Why are not the bicuspids forced outward as well as inward? I would reply that they do occur frequently outside the arch: I have several among my collection of models. The inward movement, however, is the natural one, because the crowns when in the jaw are situated between the roots of the temporary molars. The temporary molars are situated upon a smaller circle than the permanent molars and cuspids. When the temporary molars are extracted, the crowns of the bicuspids are in the radius of a smaller circle, while their roots have been carried outward by the development of the jaw and alveolar process.

The molars in the saddle- and semi-saddle-shaped arches of the upper jaw frequently diverge laterally. If the case shows a semi-saddle-shaped arch, the divergence is on the side of the deformity. If both lateral arches are involved, both sides diverge. Cases having the deformity most prominently have the most marked divergence. When a slight change exists only at the bicuspid region, the divergence in the molar region is slight. This peculiar arrangement of the molar teeth may be due to two causes. First, the teeth upon the lower jaw diverge on account of the shape of the inferior max-

illa; the farther removed from the incisors, the greater the distance between the molars of the opposite side. The molars upon the upper jaw usually articulate with those upon the lower jaw. The disparity in the appearance of the normal position of the teeth and those above described is due to the pinched condition in the bicuspid and first molar region rather than to the position of the molars. Second, when the arch is contracted at the bicuspid region the tongue is limited in its movements. In swallowing, the tongue goes to the roof of the mouth and is then forced backward for lack of room, thus shortening and consequently broadening its surface. The result of the lateral expansion would naturally be to force the teeth and alveolar process outward. A description of the following cases illustrates the theories advanced.

FIG. 7.

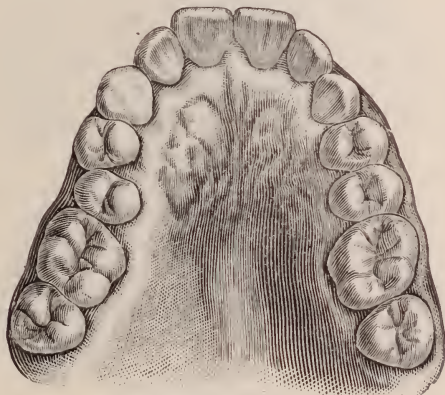
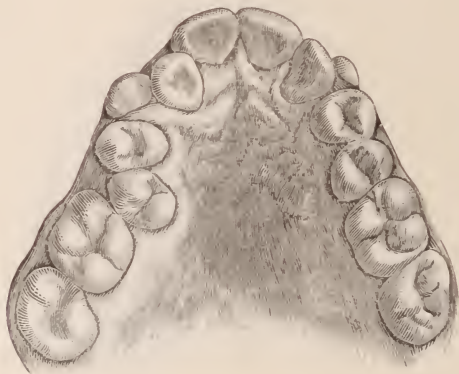


Fig. 7 shows the upper jaw and teeth of a man twenty-eight years of age. The vault is nearly flat. The cuspids and incisors in both lateral arches are in normal position, and are uniform. The anterior alveolar process and teeth do not project forward, so it will be seen that the bases of the anterior columns having been changed from the central incisors to the cuspid teeth, the force of the posterior columns, although great, has not affected the anterior columns. The left lateral arch shows a slight depression at the second bicuspid and first molar, but hardly enough to be called a deformity. The right lateral arch, on the contrary, shows a marked saddle shape. The first bicuspid is in position, the second bicuspid extends inside the arch some distance. The forward movement of the posterior column will continue to force the cuspid inward, on account of the inclination of the distal surface of the first bicuspid and the anterior surface of the first permanent molars. Only a slight divergence of the first and second molars seems to be noticeable.

Fig. 8 shows a singular combination of irregularities. A V-shaped arch is prevented by the formation of a saddle-shaped arch. In the right lateral arch we see that the posterior base (the first permanent molar) is in position. The anterior base (the central incisor) is also in position; the lateral incisor follows in the natural order. The next teeth to make their appearance should have been the bicuspid; but they were tardy. The cuspid tooth (the key-stone) in taking position has carried the lateral inward. The central incisor remains in place because the force applied by the cuspid is resisted by the anterior column, the posterior column being the weakest. If the bicuspid had been in line, then the posterior column would have been the strongest and a V-shaped arch would have been formed. As soon as the cuspid (the key-stone) had sufficiently developed, the central incisor in fact ceased to be the anterior base; but the cuspid

FIG. 8.



tooth assumes that position, and thus becomes the fixed point. The first bicuspid having first erupted held a better position in the arch than the second bicuspid, which has been carried inward by the forward movement of the posterior base, thus producing the saddle-shaped arch, which resembles the left lateral arch in the stone arch Fig. 6. A marked divergence is here noticed in the molar teeth, on account of the extreme irregularity of the second bicuspid. The left lateral arch resembles the right lateral arch as regards the anterior column and key-stone. The left cuspid or key-stone was slower in developing than the right. The forward movement of the posterior column carried the bicuspid forward and entirely filled the space. This patient was twelve years of age, and had the deformity remained without treatment until the cuspid had erupted, a veritable semi-V-shaped arch would have been formed.

Fig. 9 illustrates another singular deformity. This is the jaw of a woman twenty-seven years of age. The left lateral arch forms a per-

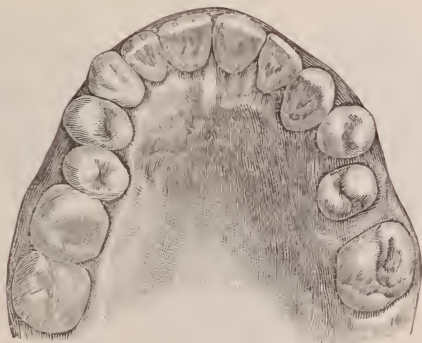
fect semi-V shape. The right lateral arch assumes a partial semi-V and a full semi-saddle shape. The incisor and alveolar process protrude, demonstrating the fact that the posterior columns are the stronger. Fig. 10 shows a semi-saddle shape in the left lateral arch, and in the right lateral arch the second bicuspid has been forced inside the

FIG. 9.



arch. The opposite side shows an exactly reversed condition. The points of lateral antagonism of the second bicuspid were outside the long diameter of the dental arch. The anterior movement of the posterior base forced the tooth outward. The formation of the

FIG. 10.



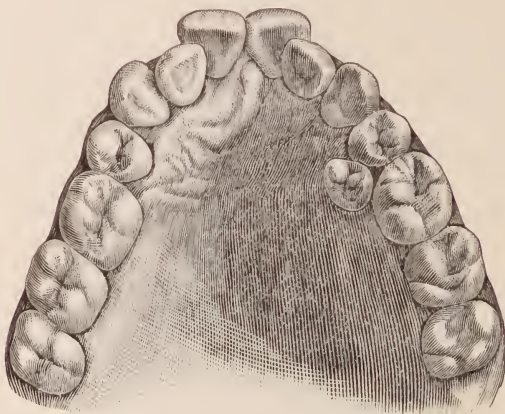
peculiar irregularity in the anterior column of Fig. 11 was explained in Fig. 10 of the previous paper. The tendency of this irregularity was to form the V-shaped variety. The irregularity of the left lateral arch is a common one. The teeth develop normally, but the second bicuspid is either retarded in its development or it is deflected inward by some local cause. The anterior base is, in this



case, Fig. 11, transferred to the first bicuspid. The posterior and anterior bases come together, and the second bicuspid is crowded inward. This irregularity corresponds to the right lateral stone arch of Fig. 6.

Fig. 12 illustrates a saddle-shaped irregularity upon the lower jaw.

FIG. 11.



The impression is from the jaw of a man fifty-six years of age; the second molars were extracted at the age of twenty-two. The irregularity was produced at the time of the development of the teeth. The teeth are large and firmly set in the powerful jaws. Asymmetry of

FIG. 12.



the jaws exists. If they had developed in unison, this deformity would have been prevented. The forward movements of the posterior columns have carried the cuspids forward and the lateral incisors inward, so that the cuspids and centrals stand on a line. The second bicuspid and first permanent molars have been forced inward

by the inclined plane formed by the posterior surfaces of the first bicuspid, and also by the articulation of the superior teeth, which form a smaller arch than the lower teeth. As will be seen, the third molars have moved forward and nearly filled the spaces made vacant by the extraction of the second molars. This forward movement was no doubt due to improper articulation with the upper teeth. The saddle-shaped arch on the lower jaw is generally due to local causes. The one illustrated is the result of both local and constitutional causes.

## ETHICS.

BY HERBERT A. BIRDSALL, D.D.S., BUFFALO, N. Y.

(Read before the Union Convention of the Fifth, Sixth, Seventh, and Eighth District Dental Societies of the State of New York, at Syracuse, October 26, 1888.)

THIS is the age of science. Whether we belong to the many who hail it in triumph, or to the few who view it with suspicion or regret, the fact is admitted. Literature must be realism; art is nothing if not technical; fancy has fled from poetry. Because it is not *science*, we are told that even our religion we hold "on sufferance only." We bow our heads like the pious men of old to the message of the prophet: "It is Science: let it do what seemeth it good." We eat scientifically, take recreation scientifically, and even our love-making is the subject of scientific consideration. We have home-culture clubs, and societies to study the best one hundred books. Juvenile scientific societies abound, and societies to discover meaning or truth in Browning's poetry. Who has not had volubly presented to his consideration the neat little volume, "One Thousand Things Worth Knowing," for ten cents?

We have all gone mad in our greed for *facts*. In the intervals when we might enjoy life, we forget to do it in digging for new facts, or in gathering together old ones, that we may make a respectable showing among our fellows. The spontaneity of life is gone. There seems no one to rise up and ask if there are not better things that we are missing, or to repeat the question of little Peterkin:

"And what good came of it at last?"  
Quoth little Peterkin."

In one of his delightful essays, Augustine Birrel furnishes us with a deliciously suggestive metaphor when he remarks that "this generation spends all the time it can spare from making or losing money or reputation in the sport of truth-hunting." Whether any good comes of it at all, or whether the game is worth the chase, we are here, camped in the woods of Syracuse, a party of truth-hunters.

And when you come to think of it, hunting and game are very like the world over. Suppose you are hunting truth. As in hunting any other game, sometimes you go for it alone, sometimes, as in our case here, in large companies. Sometimes you stalk straight upon it, and sometimes it must be surrounded. Sometimes you come upon it by accident, sometimes after long and tedious labor. Sometimes you wander through the woods trusting to fall in with it, sometimes you lie quietly in wait trusting it will fall in with you. Sometimes you are unwise and fail to find it, sometimes you are wiser and go where it is known to abound. Sometimes, as in the case of the mountain goat, you must keep carefully to leeward for fear it will scent you; sometimes, as in the case of a smaller animal, as carefully to windward for fear it will leave you in bad odor. Sometimes the finding of the game will insure your comfort; sometimes it will hold you in bondage, as when you are up a tree with the bear below.

So we might go on multiplying parallelisms indefinitely; but let us assume that we are here as *sportsmen*. How, then, are we to treat each other? The most important point to settle is who we are and what are our relations. That being disposed of, the rest is plain sailing, and anyone can work the problem out for himself from these suggestions. A suggestion is always better than a kick, and principles are better than rules. Everybody knows that among sportsmen there are no distinctions except those made by the natural lines,—age, experience, and success. We are all upon the same footing, because we hunt the same fields for the same game.

There is still a very large portion of the earth which has not known the hunter's foot, and in the fields of truth there are still unexplored vast plains and steppes and mountain ranges, so vast that only the greatest hunters can even comprehend their vastness; into which we have only made little incursions upon the outskirts. The sportsman's surroundings have their effect upon his character. His wide prospects make him broad-minded; his rugged experiences make him self-reliant and courageous; his occasional failures and needs make him charitable; so that the very word "sportsmanlike" has become a synonym for generosity and honor. To say that a sportsman treated his fellows meanly is to impugn his sportsmanship.

The *size* of the game also has something to do with it. It makes a difference with the man whether he is engaged in shooting tigers or in snaring rabbits; whether he is engaged upon the origin and destiny of man, or the origin and nature of a pus-corpuscle. This particular company of hunters is not after the largest game. The secrets of the balancing of the universe we leave to others. We even leave man in the abstract, and only try to keep the concrete

man from having more trouble than is necessary in his oral cavity. But it requires as much skill and is just as honorable to shoot a grouse as to kill a grizzly.

I suppose we are all more or less deficient in our sense of proportion. If we were wiser our vision would be clearer, though we see the lack very plainly in others,—the child will cry with equal facility for the shining sugar-bowl or for the moon.

It is not at all unusual to see a man who has shot a tip-up assert that it is a snipe. That is a very mild illustration. It would not be at all unheard of that a man who has caught an ancient woodchuck contends that he has fallen in with a belated ichthyosaurus. That is folly enough; but it would be a great deal more foolish for a neighbor of the man with the tip-up to try to convince him of his error. Let him find it out when he comes to eat it. A tip-up will never taste like a snipe, and error will never serve the purposes of truth. None of us are appointed to represent truth,—truth is the cunningest kind of game, and will take care of itself. If we could only learn to leave personal references and personal feeling out of scientific discussion, half of the problem of ethics would be solved.

Time has wrought great changes in our chosen sports. In the infancy of the race, in true infantile fashion, the twin heroes of Greece sought to win honor and riches in hunting for the ram with the golden fleece. What more appropriate than that their descendants should seek truth of whatever nature not in the modern way, but of the oracle at Delphi? We soon grew too old for that, but it has changed still, since our fathers in Europe hunted with spears and bows the wild bear,—and the boars killed more men than the men killed boars; and since Galileo, because he found that the world *did* move, was compelled to suffer therefor.

In China they stopped hunting a thousand—or so—years ago, and to this day in that benighted country rats are legitimate game, and the dictates of the household Joss pass for the very truth. Even in this campaign-ridden country, where the truth is perverted for all sorts of purposes, it is no unusual sight to see a man eating crow with a countenance indicating his extreme fondness for quail.

One of the most beneficent results brought about by time is the abolition of poaching laws. Thank God, game is now practically free the world over. Many a poor man has languished for months and years in jail, or even been hung, for catching a stray rabbit. But many more have suffered, almost down to the present time, for finding and holding the truth. This is a pregnant suggestion applicable to our profession. There are men now living and probably here present who remember when the dentist's back was against the door of his own laboratory, and there were even those who did not



scruple to die, and carry both their experience and their secrets with them.

Some of us hunt very unwisely. The two most prominent characteristics in the hunting of prairie-dogs are said to be first the extreme difficulty of shooting them at all, and second that they are of no sort of use after they are shot. To prove that Shakspeare did not write Shakspeare, or that the armored skeletons in the niches at the gates of Pompeii were not Roman sentinels who died at their posts, requires an immense amount of skillful labor; and when it is done the one harrows our feelings and the other spoils the moral of a good story, and neither is any sort of use. It will require but little searching to discover like instances of wasted labor in our own field.

There is another circumstance which has a great bearing on our treatment of each other. Experiments in life seem to prove that not only game is necessary, but ammunition and clothing and bread and houses, to which the ambition of most men bids them try to add position, wealth, luxury. Under the present social régime, competition is the law governing the getting of these things. Competition leads to the triumph of the stronger at the expense of the weaker, the working out of the natural law, "the survival of the fittest." Like bees in a swarm, no man can climb except at the expense of his fellows. Because in those things we will not be helpers of one another, we are doomed to be beggars and fighters of one another from the least to the greatest. We get so accustomed to this state of affairs that we sometimes forget our relations as sportsmen, and treat each other according to the spirit of this unseemly struggle. The two things have exactly opposite effects upon character: where one makes a man broad, the other makes him narrow; where one makes him generous, the other makes him selfish; where one makes him charitable, the other makes him mean; where one makes him dignified, the other, whether he goes up or down, lowers him in his self-respect. Let us hope that the time is approaching when the getting of life's physical necessities will be controlled by a more moral law.

The contagion of this commercial spirit seems almost irresistible. A recent humorous writer remarks that the late Mr. Crowley was probably the only individual who ever went to New York City who did not want to be inordinately rich, or one of the C. C. C. C. of Mr. Ward McAllister. To be a man may not be much, but it is the best thing on earth; and yet there are thousands of our fellow-citizens who are not half so resolute in being men as poor Crowley was in being an ape.

Few great hunters become rich; hunting and wealth are incom-

patible. From Kepler to Isaak Walton, from Galileo to Henry Thoreau, the hunters have died poor.

A direct result of the strife for wealth is the nervous intensity which characterizes this generation. The other day I read a criticism of "Paul Kauvar" in which the critic stated his belief that Mr. Steele Mackaye pulled on his boots and brushed his hair in the morning in the same tragic manner that is supposed to characterize a man in the act of committing murder. This is exactly the way this spirit insinuates itself into every department of life. Some of us do even our truth-hunting with an earnest intensity that is positively painful. To illustrate again, if anyone can understand the tariff question it is a logical mind in its calm, deliberate workings, but I called a few moments at a mass meeting recently, and the speaker was shaking his fists above his head and roaring like a bull on the tariff. We have all heard *pyorrhea alveolaris* discussed in a manner suggestive of "Give me liberty or give me death." These things have their origin in the spirit that is too restless to enjoy life or view it calmly,—that wears us out and makes us old at fifty.

The true hunter does not forget that his vocation is called a sport; and though he is sufficiently in earnest to be a sportsman indeed, he still has time to bask in some sunshine, time to wander by the brook-sides, to contemplate earth's grandeur from mountain-tops, to catch glimpses of the stars; but he has not time to join the little men who chase the shadows, who say they grow rich. His birthright is not sold for a mess of pottage, but he rejoices in life and in his boundless resources.

The moral of all this seems to be that we should cultivate the great qualities that belong to the ideal sportsman; that we should not be carried away with the hurry and bustle, the nervous high pressure which is the bane of our time, but preserve a dignified calmness and self-respect; that the little things which make for kindness, generosity, and charity are better than all the great things of this noisy world.

And now how can I close better than by quoting one of the simplest, yet the most profound injunction ever uttered on earth. It happens to be directly upon this subject,—at once the epitome and the paragon of all wisdom in ethics.

It is trite from frequent repetition, but we all need it,—it does us good: "Love one another."

## PROCEEDINGS OF DENTAL SOCIETIES.

## JOINT MEETING OF THE AMERICAN AND SOUTHERN DENTAL ASSOCIATIONS.

(Concluded from page 37.)

FOURTH DAY—*Morning Session* (Continued).

DR. L. C. INGERSOLL, Keokuk, Iowa, read a paper entitled "Methods in Dental Education."\*

Dr. D. R. Stubblefield, Nashville, Tenn., read a paper on "Dental Education Yesterday, To-day, and To-morrow," an abstract of which follows :

When the field of dentistry was new and filled almost entirely with uneducated men, each of them was, by reason of his self-election, generally equipped with a special aptitude for his life-work. Each determined his own fitness by thorough investigation of his powers, and then fully consecrated himself to his work. General education was rare, not the rule. Professional generosity was not born, and each guarded his small secrets against the treachery of others, as they termed it. That is not our way, but the customs of that day and this differ widely. They need no defender. They did too much, in the face of confessed disadvantages, to make the foundation on which we stand, for us to deny them credit or refuse to be grateful. They held firmly to their convictions and dared to promulgate them with their whole lives. The world denied the necessity of their work and refused, except from direst need, to allow them a chance to prove its value. Against the tide of all opposition they urged the bark of dentistry to respectable recognition. We have much for which to thank them, and we should be recreant to all professional heredity to refuse it. The dentists of to-day are the legitimate result of their determined adherence to principle. The writer cheerfully gives the meed of praise to the dentist of yesterday, who, as he was uneducated, suffered from a narrow view, yet who had a special aptitude for the work. We of to-day do not flatter ourselves unduly in claiming that with like careful selection and better facilities for preparation we can show greater advancement than they. A difficulty engrafted on the body professional is the lack of the painstaking, introspective self-examination formerly practiced in the selection of dentistry as a life-work. Too often the idea of great emolument proves the allurements, and natural fitness

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\* Dr. Ingersoll's paper will appear in full in the next issue of the DENTAL COSMOS.

is not considered. One becomes a dentist because his father was a dentist, losing sight of the fact that heredity has stamped him his *mother's* boy; another because a friend is practicing it successfully. Dentistry must expect to suffer from the entrance of ill-advised votaries, which cannot always be prevented. Too much care cannot be taken to ascertain the trend of the composite inheritance of a child. The children of any profession are the natural recipients of any hereditary qualification for that profession, but the flow of heredity is deflected and often changed entirely by the other side of the family. None can doubt that different men have different qualities of minds, and that therefore they are better fitted to follow some profession than any profession. Some will follow almost any with credit, though they would have gone higher in a calling that satisfied their whole nature. If this is true, the practice of dentistry offers the best field for some of the diverse minds of the world, and these are the ones out of which to make the dentists of to-morrow. Three things are to be demanded for their proper education: *First*, from themselves, a broad foundation of primary education, as preliminary to all other intellectual preparation. *Second*, from the profession, the establishment of a higher, better, moral tone. *Third*, from the schools, a sensible elevation of the standard of excellence, a judicious extension of the curriculum, and a more rigid demand for thoroughness before conferring degrees.

The subject was passed. Hygiene was called, and Dr. Geo. J. Friedrichs, chairman of the joint committee, read a paper, of which the substance is as follows:

It would be impossible to give an exhaustive report of the entire field of hygiene, consequently the paper would be confined principally to hygiene as it relates to dental and oral surgery. The usual definition of hygiene as being "the art of preserving health" is defective, since it is more than an art, because it aims to increase and improve as well as preserve, and the word "health" is too vague to be of much value in this connection. Hygiene commences the moment two animated wandering microscopic molecules meet and mingle into that other which shall grow into what we are. Neglect of the body is the most frequent cause of all the suffering and sorrow of mundane existence. The microbial discoveries of Pasteur and Koch and their disciples have placed our therapeutics on a new basis. Koch is credited with the assertion that the student will soon know septicemia only as he now knows scurvy, by description. Dietetics is now shorn of much of its empirical crudities, and though still incomplete it stands to-day in the front ranks of medical art for accuracy, efficiency, and importance. It has joined hands



with organic chemistry to determine the pabulum of physiological life, and with physiology to more clearly elucidate the functions of digestion, assimilation, and nutrition. The question, What is the best substitute for human milk? remains *sub judice*. Cow's milk, somewhat modified, seems the most rational and favored substitute, but experience and precept are sometimes upset in the cases of infants which do not digest milk, but do digest modified starch foods. Nauquelin and Jäger recommend a mixture of cow's milk and meal broth as the next best thing for infants to woman's milk.

Oral hygiene is of the utmost importance to every one who has the object of health in view. There is no doubt that could perfect hygienic conditions be obtained and maintained, perfectly organized teeth would result, and dental caries become a disease of a past generation. It has been conclusively proved that the micro-organisms found in the oral cavity are the prime factors in producing decay of the teeth, and efforts have been made, so far without success, to discover some germicide that would kill these fungi without being deleterious to health.

We speak of teaching hygiene to our patients and the public, but we should teach it first to our own profession. How can we excuse or extenuate the ignorance or neglect that permits pathological conditions to exist in the mouth, placing life in jeopardy simply for the sake of retaining for a few days longer an ulcerating tooth?

Dr. Friedrichs then cited cases of death and serious illness from ulcerating teeth or abscess, which as he claimed showed an indifference to the first principles of hygiene which he feared was too widely entertained by the profession at large. Let us cultivate a better understanding of the laws of hygiene and apply them in the practice of our profession to the best advantage. Could the grave reveal its secrets, he had no doubt thousands would be found there cut off untimely, in whom the first fatal impulse was given through the neglect, indifference, or ignorance of the plainest rules of hygiene as applied to the oral cavity.

### *Evening Session.*

The joint meeting was called to order at the usual hour by President Abbott.

The paper read by Dr. Knapp was declared open for discussion.

Dr. John C. Storey, Dallas, Texas, referring to the toxic properties of cocaine, said that some time since in his city, in administering the drug, a few drops were spilled upon the floor. The next morning three dead rats were found near the place where the cocaine was spilled. As an experiment, more of the drug (four per cent. solution)

was placed upon the floor the next night, and in the morning four more dead rats were found. It will kill men, too. There have been several serious cases of cocaine poisoning in Dallas. In bidding a final farewell to the meeting, he would make the suggestion that hereafter papers to be read before the associations should be shorter and more concise.

Dr. Geo. J. Friedrichs, New Orleans, had read the British journal referred to in the report, and has been constantly on the lookout for the symptoms suggested as occurring from the toxic action of cocaine, but he has not known of a single case where it was used for extraction. He has been using it by hypodermic injection for two years, and his son has a clinic at the Charity Hospital, where they extract sometimes as many as forty or fifty teeth at a clinic. Neither in his son's practice nor in his own has any symptom of the toxic action of cocaine presented itself. The nearest to it that occurred to him was when a lady complained that she felt a choking sensation and had palpitation of the heart. In tracing the history of this patient he learned that she was hysterical, and, as is well known, in such subjects serious symptoms may occur from the injection of water. He uses the four per cent. solution. It does not require that the needle penetrate very deep. Simply pierce the gum and inject, when you can watch its action. It drives the blood away, and a spot surrounding the puncture becomes white, and you can keep on till the white spot spreads over the surface of the tooth to be extracted. Of course, both sides of the tooth are to be injected. Then wait about three minutes. Patients usually simply feel the extraction. Sometimes they say it hurts a little, but not so much as it would without the cocaine. The longest duration of symptoms in his experience was two hours.

Prof. Matthews, Louisville, presented a communication asking the members of the joint meeting to meet with the Mississippi Valley Medical Association in September. The communication was received and accepted, and the secretaries were instructed to convey the thanks of this body.

Dr. W. Xavier Sudduth, Philadelphia, had had quite an extended experience in clinics with cocaine, varying in strength from four per cent. to fifty per cent. He had seen no bad results, and he had followed the history of cocaine pretty closely. His opinion is that it is like a great many other drugs: there are idiosyncrasies of temperaments where it is unsafe to administer cocaine, but it is as safe as the average local anesthetic. There are isolated cases where untoward results follow its use, but in these if other drugs are employed we have the same or similar effects.

The subject of Prosthetic Dentistry, Chemistry, and Metallurgy

was passed, and Dental Education, Literature, and Nomenclature was taken up.

Dr. Ottofy's report and the papers by Drs. Atkinson and B. Holly Smith were passed without discussion.

Dr. Harlan suggested that the writers of the papers give briefly the points they had made, in order to facilitate discussion.

Dr. Ingersoll said that the sentiments he had expressed were not new to him if they were to others. He has held the same views for many years, but he had never before so fully stated them. He has always taken the ground that dentistry is not a specialty of medicine, notwithstanding it has been so declared. He means medicine in the common acceptance of the term. Dentistry is a specialty of medicine if you make medicine mean all that there is to be known of the human body. Do you find dentistry in the medical literature of to-day? What is medicine? The medical colleges are the representatives of medicine in the educational world. There is no dentistry there. Medical men know nothing of dentistry. Not one of them can give any practical information on dentistry. Dentistry is a specialty of medicine only in the broad sense in which we never use the term. He has always contended that dentistry is a separate science. When we are studying anatomy or physiology, we study a branch of the scientific knowledge which belongs to the world. He does not see how dentistry can be known as a specialty of medicine except as he has stated. In teaching dentistry we need a separate and distinct set of text-books with their information specially adapted to the needs of the dentist, because we cannot do successfully the work we ought to do for dental students in the same classes with medical students. So placed, the dental student spends a great deal of time in things that are of no use to him.

Dr. W. H. Morgan, Nashville, Tenn. The most radical view in Dr. Ingersoll's paper was as to the manner of teaching, and in the main the speaker agrees with that view, though if the records were looked up for twenty years back, he might be convicted of having expressed the opposite opinion; but his views have changed, and he now thinks that if every medical college was wiped out of existence, and every strictly medical book burned, it would scarcely cause a ripple in the progress of dentistry. We would go on and qualify men for practice just as before. The particular point in Dr. Ingersoll's paper to which he wished to draw attention was his advocacy of the recitation method of teaching dentistry. This method is not in use in the school with which the speaker is connected, but he is convinced that it can be made the most efficient, the most thorough method of imparting dental knowledge. He is led to think this from his observations of the progress of students in the dental school connected



with Meharry Medical College, which, as is probably known to his hearers, is a college for the colored race. They have didactic teaching in this school, but in some things the students are required to recite from memory, and it is surprising what exact knowledge of the subjects so taught they obtain. He does not know but that the whole field of theoretical knowledge might be occupied better in that way than any other. He hoped to see the time when something would be done in that direction and teachers give their lessons in that way.

Dr. Ingersoll found in a late issue of the *Independent Practitioner* an illustration of the method he recommends, in some condensed statistics with reference to railroads. Here in less than a page will be found all the information and general facts about railroads that would be contained in a book of fifty pages.

Dr. S. H. Guilford, Philadelphia, cannot agree with the principle advocated by Dr. Ingersoll, because the method of teaching he recommends seems too primary. It is good for children, good for young men in the beginning of their studies, good when there is plenty of time to be spent in acquiring knowledge, but not good in professional education. Students, when they enter dental colleges, are supposed to have acquired some education, and we do not want to teach them in the same way we would children. It would take a long time to get over the ground, although he would admit that it would be covered more thoroughly by the catechetical method suggested by Dr. Ingersoll. The object of teaching is to impart a certain amount of information in such manner that the students will retain it. While the student is preparing for college he does a certain amount of studying. In former days he selected his preceptor, from whom he would learn the operative part of his work and to whom he would recite under instruction. He would thus familiarize himself with certain text-books, and would be prepared for didactic teaching. We don't expect them to retain all that they hear, but to find out how much of it they do understand they are "quizzed" upon the subjects of the lectures, and then they go into the clinic-rooms and perform the operations. If that kind of a system don't make them retain the things they are taught, the speaker does not know what will. Another thing: If we are going to teach from text-books in the way Dr. Ingersoll recommends, where is the work that covers all the ground? In operative dentistry, for instance, the teachers are supposed to be familiar with different methods, all of which they teach. The text-book would be limited in this respect, and the teaching would be confined largely to one man's methods. The fact is that a text-book, when once written, soon becomes obsolete. There is hardly one before the profession that is fully up



to the times, and he believes the schools give a broader education by didactic teaching than they would by the proposed system.

Dr. J. Taft, Cincinnati. All that can be said will not change the course of events. They arrange themselves. And all that can be said does not convince anybody that dental practice is not a part of the science of the healing art. We talk about our independence of medicine, if we choose; but we are not independent in anatomy, in physiology, in pathology, or in chemistry. The more we have of medical science the better prepared we are for our special work. What therefore is the use of all this talk, as though we could cut apart the bonds that tie us to the science of medicine and throw its aid to one side? The matter of methods in teaching is important. More ought to be done in fitting the student for practice than has been done, and it would be very greatly to the advantage of all concerned if the methods of teaching in the various schools could be made uniform. Many things said in the paper are excellent. How to get at the improvements it suggests, is the question. Something might be done by intercourse among the colleges. The details of teaching, as the lecture method, the quiz method, the question and answer method, etc., will be largely arranged to suit the preferences of individual teachers; by becoming familiar with one another's methods and observing the results much might be gained. The system of question and answer might be adopted with advantage. A syllabus might be prepared, with frequent reference to the best light the literature affords, the student being required to look the matter up and write out his views after looking it up, this expression to be criticised by the teacher. If any question strikes a student during a lecture, let him rise in his seat and ask it.

Dr. Catching said that it made him sad to see a professor of a college, yea, a dean, suggest that all the medical colleges and medical books could be destroyed without causing a ripple. In such a position he would not express such an opinion even if he thought it, but would encourage students to acquire all the medical knowledge they could.

Dr. Ingersoll's paper was passed, and that by Dr. Stubblefield was taken up.

Dr. Atkinson knows of no school, medical, dental, or class, which goes to first principles, only in name, and the truth has to be revealed to the student by the surroundings. He is the best teacher who so presents his subject that the student grasps the underlying principles, and the best way to lead the pupil is to lead him very simply. There are two kinds of simpletons,—beginners and the ripest scholars; the former because they know nothing, the latter

because they see how little they know of what should be within their grasp. The paper is a beautiful expression from a ripe mind on an elaborate subject. Who knows how medicine—how oxygen, how quinine—acts? If we have to get the demonstration at each step of our mental operations, how are we to formulate that which is to be beneficial to anybody else? If medicine has power it ought to be able to exercise it, but it does so only under certain circumstances.

The subject was passed, and Dr. Friedrichs's paper on "Hygiene" was taken up, its author re-stating some of its principal points.

Dr. Atkinson pronounced the paper the most concise, logical, and regular in its order that he had ever heard on the subject. Any departure from health will be disease, and that disease may either be within the range of our consciousness or it may be a sub-consciousness. It is the hunger of the atoms to unite, of the molecules to unite, of the corpuscles to unite, of the tissues to unite, that makes the system in which consciousness holds its court. A tonic is food that enters the tissues and makes them strong. A stimulant is anything that starts the fluids and wakes them up, but it does not enter into the tissues and communicate strength to the part. That is the *a, b, c* of the condition of health and disease.

Dr. J. J. R. Patrick, Belleville, Ill. There are positive facts in every one of the sciences on which medicine is built. No one who knows anything about it will say that any professor of medicine claims that the practice of medicine is a science. Books on the science of medicine are not called "science." The professor in the medical college lectures on theory and practice. There is a science of astronomy, also of chemistry, also of anatomy. Owen constructed a bird from a bone, and years afterward it was found in the ice of Siberia exactly as Owen constructed it. So of the mammoth. It was taken out of the ice in Siberia years after it had been constructed from a tooth. All of these sciences had their spiritualistic side. Chemistry had its alchemy, which was in fact the father of chemistry. Astronomy had its astrology. But the moment you depart from the knowable, you are lost.

The discussions were closed.

President Abbott had thought at one time that the meeting would not be a profitable one, but he believes now that everyone who thought that way has changed his opinion. He felt sure every member of the American Dental Association had enjoyed his visit here. We have found time to get acquainted with one another, and we have been made to feel that there is no North and no South in

dentistry. Let us continue to work together as harmoniously as possible for the upbuilding of dentistry.

President Catching replied that the meeting of the Southern Dental Association with the American Dental Association had been a source of wonderful pleasure and delight, and he also returned thanks in the name of his association to the citizens of Louisville for their hospitality.

Adjourned, to meet at Saratoga, N. Y., Tuesday, August 6, 1889.

### NEW YORK ODONTOLOGICAL SOCIETY.

THE New York Odontological Society held its regular meeting Tuesday evening, November 20, 1888, in the Academy of Medicine, No. 12 West Thirty-first street.

The president, Dr. J. Morgan Howe, in the chair.

### INCIDENTS OF OFFICE PRACTICE.

Dr. S. G. Perry. It will be remembered by most of you that at one of our recent meetings I presented a porcelain crown, which was about the same thing that my good friend the secretary, Dr. Howland, had exhibited some years before, and which I had failed to see and appreciate at that time. But whatever may have been the origin of the crown,—and undoubtedly the credit of it is due to him, and the discredit to me for not having seen what he had done,—I want to show a further point in connection with it when it is applied to frail roots that are liable to split apart. A very narrow band is fitted carefully around the neck of any root, a cap placed on top of that, and a pivot fitted in the root and through the cap, the whole being then soldered together. One or two vent-holes are then drilled through the top of the cap, and it is set to place with oxyphosphate, the excess coming out through the holes. These holes are then reamed out and filled with gold, and the edge of the band under the gum is burnished to the root. The tooth is then fitted to this cup and set on the projecting pivot with oxyphosphate. The advantage of this plan is that the root being slightly tapered with proper paring instruments, the band can be made to fit absolutely, while the excess of oxyphosphate is gotten rid of through the vent-holes instead of being squeezed out around the edge of the band. The edge of the band being made to a knife edge, and the tooth not at that time being in the way, it can be burnished and will not irritate the gum or leave a shelf as is the case with a thick band that often does not fit the root. Then we have the final advantage, as it seems to me, that the crown is the weakest part of the whole



structure, and if anything breaks the crown is sure to give way and not the root; and if the crown does give way it is only a matter of a few minutes' work to put on another without disturbing the structure that is built underneath it. This applies to molars and bicuspid, and perhaps in some cases to front teeth also. Sometimes it will be an advantage there, because it gives an all-porcelain tooth on the palatine side. Several actresses have told me that they would not have any other, because they dare not stand before the footlights with the chance of gold glistening from the under side of their teeth, as it must do. I do not remember to have ever seen an account of this method of setting a crown. Another method, that I have employed with these teeth as well as with the old-fashioned pivot teeth, is to prepare the root even with the outline of the gum, and set a pivot into it with oxyphosphate. I cut the end of the root very smooth and even, and then fit the base of the crown very accurately. I then make a mat of several thicknesses of soft gold No. 5, and cut out a clean hole in the center of it, of the size of the pivot. I then put it over the pivot and on the root as a washer. I then set the tooth on the pivot with oxyphosphate. If in time the oxyphosphate wastes, the gold remains to preserve the root.

Please note the bicuspid root that is shown with one of these crowns attached, as that is a tooth which I implanted last winter, or last autumn. It did not promise well from the first, because I could not get a good socket. The tooth became attached somewhat, particularly to the gum, but the root was absorbed as you see, and it finally dropped out.

You may remember the condensing lens which I showed, attached to the bracket rod of the operating chair. I have been fortunate in obtaining some mirrors which are of a great deal of value to me. They are of about two inches diameter and three-inch focus. They are such as are used by microscopists, are silvered on the back, and are covered with some waterproof preparation. I have been not a little surprised with what I can accomplish with a little mirror like that. That brings up the question of the illumination of approximal surfaces and all distal places in the mouth. After becoming accustomed to this method of looking directly in the glass to see the teeth, it seems to me that I would never be content to go back again to the ordinary method of operating. This glass makes the imperfections in the best work I have done so plain that it is almost disheartening. As a rest to the eye it is a great advantage. With a mirror of that size one can glance over the whole arch at once and see everything in their exact relations. They can be procured at any optician's, I think. The absence of a handle seems sometimes to be an advantage.



The President. Gentlemen, I brought with me this evening two pairs of models which show the lengthening of a short bite. In those numbered 1 the lower incisors strike the upper teeth at the junction of the gum. It will be remembered that in the case presented by Dr. Colignon, of Paris, the device that was used which resulted in an elongation of the bite was a plate on which the lower incisors struck so as to keep the bicuspid and molars from touching. In the case which these models represent the patient was past thirteen years of age when a similar plate was put in, and was worn for six months. The articulated models marked 2 are mounted so that by looking in at the back it can be seen that the lower incisors do not touch the upper by nearly an eighth of an inch. There has been no change of articulation,—this was correct before,—nor have the inferior incisors changed their antero-posterior relation to the upper teeth, but the apparent elongation of the bicuspid and molars is quite marked, so that there seems to be no reason to refer the opening of the bite of the anterior teeth to any other than the latter change. I call your attention to the fact here shown, in order that there may be no doubt that, at least in this case, there has been no change in the size of the angle or shape of the jaw, a theory advanced in 1884 by Dr. Coar, of Cologne, to account for changes which he had produced by similar means, and suggested again by Dr. Barrett, of Paris, last year.

The corresponding secretary read the following communication :

“73 BOULEVARD HAUSSMANN, PARIS, FRANCE,

“September, 1888.

“MR. PRESIDENT: Since the publication of the discussion of Dr. Flagg's paper, a pamphlet has been widely circulated pretending to show that by misquotation I had misrepresented and treated him unjustly.

“I beg to state before the society that my quotations were accurately made word for word, as I can show by reference to the stenographer's type-written copy of his notes and after having been corrected by Dr. Flagg himself. E. A. BOGUE.”

Dr. C. E. Francis. Mr. President, I felt very much gratified to receive the thanks of the society for the visit they paid me. I think, however, that I ought to thank the members of the society for their kindness and trouble in going up there. It certainly gave me great pleasure to see them at my house. But I arose for another purpose. The American Academy of Dental Science held its annual meeting in Boston last week. I presume that every member of this society received an invitation to be present, for it was understood that a special invitation was given to members of this society. I

was one of the few who were fortunate enough to be present, and I think that the gentlemen who were there with me will testify to the royal good time we had. The Boston people have certainly shown themselves to be exceedingly hospitable men. A better reception we could not have received anywhere. It seems but right that we should make some acknowledgment of their kindness to us; therefore I will offer this resolution:

*Resolved*, That the thanks of this society be tendered to the American Academy of Dental Science for the kind invitation sent to our members to attend their recent annual meeting, and for the excellent reception given to those of us who were so fortunate as to be recipients of their generous hospitality.

The resolution was unanimously adopted.

The President. The subject of the evening is "The Antrum of Highmore and its Diseases," which Dr. Frank Abbott has kindly consented to present to us. I have the pleasure of introducing to you Dr. Frank Abbott.

[Dr. Abbott's paper will be found at page 81, in this issue of the DENTAL COSMOS.]

Dr. Abbott, after reading his paper, spoke as follows:

I have here to show to the members the materials which I use in treating these cases, if they wish to see them. The spray syringe is an instrument that was first invented by Dr. J. N. Farrar, of this city, some years ago. When the point of the syringe is carried into the antrum a sufficient distance, there will be half a dozen or more of the holes in the end and sides of the syringe-point opening into the antrum itself, and the spray can then be thrown so as to reach all parts of the cavity. If there be no particular hypertrophy, nor anything to prevent, the antrum will be washed out very thoroughly.

This skull shows that the extraction of a tooth left a hole in the floor of the antrum. The gentlemen will observe that when the instrument is inserted the holes in the end and sides of the point are within the cavity.

This second skull shows the frontal sinus on one side, and the antrum on the other. The spray apparatus that I use consists of an air-pump and cylinder connected with the syringe-point and medicine reservoir by means of a long rubber tube. When the opening into the antrum is reduced and becomes so small that it is difficult to introduce the larger point, it is changed for a smaller one. The object of this spray instrument is to throw the remedies used more forcibly into the antrum. This has now a pressure of forty-five pounds to the square inch, and it will be noticed that it throws a spray in all directions.

In a late issue of Christopher Heath's work upon Diseases of the Jaws, he states that the antrum in old age becomes smaller, that it

is growing smaller all the time as we advance in life. Now, that depends, in my judgment, upon whether the teeth have been lost or not. In no case where the teeth have been kept in the mouth do I think the antrum is at all smaller in old age than it is in middle life, or even at an earlier age. In looking at this skull you will see very great absorption, not only of the alveolar process, but of a considerable part of the maxillary bone itself, because of the early loss of the teeth; consequently the antrum has been infringed upon and has been made more shallow than it probably was when the teeth were in the mouth.

The President. Gentlemen: Dr. Streeter has kindly consented to continue the discussion of this subject this evening, and if he pleases we will now have the pleasure of hearing him.

Dr. R. M. Streeter. Mr. President and Gentlemen: When your noble president came to ask me to say a few words after the reading of Dr. Abbott's paper, I consented to do so, knowing very well that Dr. Abbott would say all that was necessary to be said. In fact, I did not know but he would tell you a little too much, and I am not sure that he has not. I was unfortunate in not being present in time to hear the first part of his paper, which I very much regret, but judging from what I did hear I feel sure he has given us an excellent treatise upon the subject before us. In my experience with diseased antrum, I have found the lesion in nearly every case to be secondary to a diseased tooth or teeth, but sometimes it has been engorgement from inflammation of the mucous membrane. Should the latter be the case, then an opening should be made into the antrum to relieve this condition and for medication. The opening should be made if possible without sacrificing a tooth, and at such point through the alveolus as under the circumstances of the case seems most advisable. In lesions secondary to the teeth, first remove the irritants, and if there should be necrosed or carious bone remove that also; then, by keeping the parts well cleansed, the patient will usually do well without further medication. In the treatment of the antrum, one great thing in my opinion is not to do too much. I believe it is more often over-treated than otherwise. Little or nothing except to provide for and keep the parts clean should be done after the surgical part has been completed. For cleansing the cavity I have used peroxide of hydrogen, or hydro-naphthol, or salt and water; for a local stimulant, equal parts of iodine and alcohol; in case of much ulceration of the mucous membrane, a weak solution of chloride of zinc. And it is a great comfort to the patient if these remedies are used slightly warmed. My method is, after filling the syringe to place it in moderately hot water for one or two minutes.



Dr. Dwinelle. I have had considerable experience in the treatment of disease of the antrum in the course of a long practice, and, as Dr. Streeter has remarked, the remedies used have generally been simply the removal of the irritating cause, establishing a thorough draining, and leaving the rest to nature. In cases of serious or alarming character we sometimes have to resort immediately to the most heroic treatment. I have had some very extreme cases, and might mention a number, but will be satisfied with referring to one, for the moral that may be deduced from it. It was one of those instances which illustrate "the ignorance of the learned" to a very large extent,—a case that had been in progress for a series of years, and had been under the observation and treatment of the best medical and surgical knowledge and practice in this country and in Europe as well. A lady who formerly lived in Madison avenue, not far from here, had a very singular disease, which resulted in the loss of the senses of taste and smell for several years prior to my seeing her; it resulted in the lateral protrusion of the eye on the left side, accompanied by double vision, together with distention of the sutures of the bones of the face immediately beneath the orbit, and in several other serious symptoms, such as the trickling down the throat of an excoriating fluid, causing a constant irritating cough. The trouble was, as her physicians said, hastening her into consumption and the grave. She had been under the best medical treatment possible to command in this country or in Europe, she having gone there two or three times with the vain hope of relief; and as a last resort she was sent to the Springs while abroad, which is often significant of the abandonment of all hope. She returned to this country to die. By accident she was thrown into my hands, and I discovered at a glance that all her troubles proceeded from disease of the antrum induced by a diseased tooth, a superior twelfth-year-old molar on the left side. I carried a probe up behind the tooth to a distance almost incredible; on removing it I found it covered with matter of the most offensive character. I comforted her and her husband with the assurance that the disease could be cured very readily. I extracted the tooth the day after, and found I was right in my diagnosis. There was a large quantity of diseased bone at the base of the antrum, which I reamed out with a large-sized reamer, and when I had the cavity freely open I found it full of degenerated pus, which I washed out with various remedies, many of which Dr. Abbott has indicated to us to-night in his very interesting paper. The opening into the nasal cavity was very nearly closed, but I succeeded in probing through it, and after appropriate treatment she commenced improving. After treatment for a considerable time with local stimulants together with tonics generally,



she became entirely well. There was then a very large opening in the antrum,—I could put my little finger up through it,—and there was so little material appropriate for the purpose the question was how to close it. I took a curved lancet and cut the tissue around the cavity, bringing the sub-incision down to the edge of the cavity, making a sort of collar or ruffle, which I reversed so as to bring the raw surfaces in contact, and secured them in place with a Marion Sims silver suture. The opening closed up, and I afterwards inserted a full denture of artificial teeth, which she wore for many years. I think she lived twelve years afterwards, and had no return of the trouble. I have had a variety of cases similar to this. This was one of the most extreme ones, and the wonder is that the trouble had not been discovered by others. It is also remarkable that she had not died from blood-poisoning or septicemia long ago. It was a case that any one of you would recognize at a glance as a very pronounced case of disease of the antrum, and yet it escaped the recognition of the best surgeons throughout this country and Europe.

Dr. S. E. Davenport. If Dr. Dwinelle will pardon a Yankee for guessing, and if the guess be correct, I would like to add that the lady to whom Dr. Dwinelle has just referred did on several occasions before her death acknowledge to me that her life was due to the skillful care of Dr. Dwinelle, and much more than he has told us to-night of her sufferings before she was so fortunate as to come under his professional attention was true. And perhaps I may be excused for adding also that the lady was greatly astonished at the small fee, as she denominated it, with which she was favored by our talented and successful colleague. I must commend Dr. Abbott for his concise paper, which so ably covers the whole subject.

Dr. Dwinelle. Excuse me for saying another word about this case. I found the cavity full of degenerate pus of a most offensive character, which I found had become so impacted and dense that it literally had to be excavated. I found furthermore that the absorption of the bony walls of the antrum had extended very largely, so that it had probably increased in size twofold or more. In her case taste and smell were entirely restored, the eye resumed its normal position, vision was restored, and the projecting cheek became consolidated and returned to its former healthful condition. The husband of the lady referred to wrote me a letter warmly expressing his gratitude for my saving the life of his wife, an opinion which was generally shared by his medical friends.

Dr. Perry. May I ask Dr. Abbott and Dr. Streeter whether in such cases they have used iodoform?

Dr. Abbott. I never do.

Dr. Lord. In all the years I have been in practice I have had but

two cases of antrum trouble, and of course my experience has been very limited. In both of these cases I took advice and direction to a great extent from some of my professional brethren who had seen and treated more of such cases. The last case I had seemed to be very serious, and I at once consulted Dr. Abbott, and afterwards I advised with Dr. Streeter,—the two gentlemen who have discussed the subject here this evening. The trouble in this case was occasioned by the irritation of a pulpless first superior molar, and the disease had evidently been going on for a long time; but neither the tooth nor the parts had given much trouble. The floor of the antrum to the extent of half an inch in diameter, I should think, had been absorbed, or came away in small pieces when the tooth was extracted. The very large opening rather frightened me, because I had had no experience with anything of that kind; but the case yielded to very simple treatment and the parts healed very nicely indeed. I used as an antiseptic and stimulant a very weak solution of phenol sodique. I also occasionally used a weak solution of peroxide of hydrogen. That seemed to work beautifully in cleansing the cavity, and the trouble all subsided in about three months and was cured. To keep that opening I used, as was suggested by Dr. Abbott, a little plug fastened to the teeth, the relations of the teeth to the opening permitting me to do so very nicely; but there was a little movement of it, and it was not quite comfortable. It was very necessary in this case not only that the opening should be kept open, but that it should be covered over to prevent the food from getting up into the antrum; and some one suggested to me—I think it was Dr. Howe—to prepare a little plate of vulcanite and fasten to the adjoining teeth, with a little projection upon it, so that when the plate was fastened in place the projection would go up into the opening. I made such a plate, and it worked like a charm. The other case yielded very readily to simple cleansing and slightly stimulating treatment. In this case I advised with Dr. Northrop, and his advice proved to be good.

Dr. William Jarvie. This class of cases do not all end as pleasantly as those which have been related to-night. I have never had but two cases of diseased antrum in my own practice, although I have treated several, and I shall never forget the result of one of them. The occurrence took place some ten years ago, and was about as follows: A gentleman whom I had not seen for a number of years, and who had very fine teeth, came to me, and I noticed that the gum over and about the right superior first molar was swollen and discolored. I asked him if he felt any discomfort there, and he said he did not. I suspected then that there was trouble with the antrum. I asked him if he had any discharge from the nostril on that side, and he said no, he had never had anything of the kind.

The next day the gentleman came in and said that he was afraid he had misled me very much, that for years he had had catarrh and a slight discharge from that nostril, and there was a little discharge into the throat; but as I had spoken of something in connection with the teeth, it was not until he was in bed that night and thinking the matter over that the discharge from the nostril occurred to him. I advised the extraction of the tooth at once. The gum had an angry look. The gentleman took gas and had the tooth extracted. He came to me in the afternoon, and on probing I found an opening into the antrum, and there was a discharge of a very offensive character from it. That was Tuesday afternoon. He then told me of the symptoms he had had for a long time,—a dull heavy pain and a sense of fullness on that side of his face and head,—but still he never associated it with the teeth until this day. He slept better on Tuesday night after the treatment than he had for years, and continued improving until Saturday. He was then very desirous of being in Boston on Monday, where he had business of an important character, and also wished to spend Sunday in New Haven; and as he was getting along so nicely, I thought it would be perfectly safe for him to leave on Saturday and spend Sunday in New Haven, go to Boston on Monday, and come back to Brooklyn on Tuesday. I did not know of any dentist in New Haven to send him to to have the plug removed and the cavity washed out, but I advised him to go to the dentist of his friend's family there, whoever he might be, knowing that they would have as good dental services as could be procured in New Haven. I did give him the address of a dentist in Boston to whom he could go and have it dressed on Monday. The jar and motion of the train seemed to have a most unpleasant effect upon him, so that when he reached New Haven on Saturday evening he felt very poorly and went to bed. Sunday morning he was very ill, and he sent for the family physician, who treated him. I did not learn of this until several days afterwards; for the next I heard of him in any way was seeing a notice of his death in the paper of the following Friday. I should judge from the account sent from the family that he died from septicemia. He died on Thursday, and his sufferings until he became too weak to feel were intense, and his condition exceedingly offensive in the way of odors to those who were about him. His physician did not deem that the diseased antrum had anything to do with his illness, and the antrum was not touched at all. It was suggested that I be sent for, but the physician thought it was not necessary,—that he knew what was the trouble and could treat it without any assistance from me. Whether with proper care of the antrum he would have recovered or not, of course we cannot tell.



Dr. Abbott. It would seem from what we read in reference to these cases that it is a common practice among dental surgeons and general practitioners, certainly in England, to open the antrum, by removing a tooth or otherwise, give the patient some remedy and perhaps a syringe, and tell him to wash it out once in a while. If the patient gets well he is fortunate; if he don't it is all the same, I presume. Sometimes the patient is given some remedy and told to take a mouthful of it and force it up through the antrum and out through the nose, and in that manner wash out the cavity; they speak of it in a very light sort of way, as though it amounted to comparatively nothing. I know that is the case to some extent among physicians in this country. I remember one case that came to my notice some twenty years ago, which shows what country practitioners and ignorance will sometimes do. This was in a small town in the interior of this State. A man said to me, "Doctor, I have something the matter in the side of my face; it seems sometimes as if my whole head were going to pieces, as if I was going to break up and die very shortly; I wish you would look at it and tell me what is the matter." I took him to a friend's office, a physician, and with a probe I went up through an opening about the size of my little finger, in the space where the first or the second molar had been taken out of the left side of the upper jaw. The probe struck something very soft; I then took a hook and hooked out a piece of cotton. Then I went in and got another, and another, and another, till I had taken out of the cavity enough cotton to nearly fill my hand, when the pressure was removed from it. It was a most remarkable sight. He said a dentist in the town had packed it in there. I was going away in a few days, so I gave him a weak solution of carbolic acid and a syringe, and showed him how to wash it out after each meal, and left him to take care of it. In two or three months I heard that the trouble was cured and the opening healed, all by his own work. There are cases which will succeed with such treatment; others in my judgment would not. I had another case that was very interesting to me. A young man came to ascertain what was the matter with the side of his nose and cheek, where it seems there was considerable necrosis of the superior maxillary bone. There was a general invading of the walls of the antral cavity. I found quite large pieces of bone sticking out in three or four different directions. I told him the best thing to do was to have them removed, and he said, "I wish you would take them out right away." I took out five or six pieces of bone, removing all there was of the section from the site of the first bicuspid back to the wisdom-tooth, and extending to the floor of the orbit, so that you could stick your thumb into the opening.



When I dismissed him he said he felt very much better. Two or three months after that he sent another patient to me because I had cured him so easily and quickly. He got entirely well just by that operation alone.

Dr. Lord. Mr. President and Gentlemen: I am sure that all who were able to accept the invitation and attended the meeting of the academy in Boston will corroborate all that Dr. Francis has said. The presumption is that every member of this society was invited by the academy to attend their annual meeting, which was certainly a very great compliment, and it seemed too bad that so few accepted the invitation. It is certain that they missed a great deal by not being on hand. Those of us who went by the afternoon train were met at the station, on our arrival at Boston, by the president of the academy and one of the members, who welcomed us and accompanied us to our hotel. I do not know that they had any intimation that any of the gentlemen from New York would come by that train,—at all events they were there, and I think they were there upon a venture.

I may say that the programme for the occasion was fully carried out—and more. On our return to the city from Cambridge, where we were taken to visit, more particularly, the Peabody Museum, that renowned repository of American archeology and ethnology, we were taken to one of the most fashionable club-houses in Boston,—which, by the way, is a new house for the club, and a most gorgeous house it is in all its appointments. Here we were served with a luncheon, such a one as an institution of that kind would be likely to furnish.

After the business of the annual meeting and the reading of their usual address, which was given by our fellow-member Dr. Francis, in due time we were all seated at the banquet-table. This was a part of the programme of very great interest, almost to inspiration. There were present several of the very oldest practitioners in the county, a large number of the middle-aged, and a goodly number of the young men of the profession, all of whom it was very delightful to see.

The after-dinner speaking was good, for the most part, and the whole affair was one of very great enjoyment; and, as I said, the members of the New York Odontological Society have reason to be proud of the compliment that was paid them on that occasion.

On motion of Dr. Woodward, the thanks of the society were extended to Dr. Abbott for his very interesting paper.

The president stated that the meeting in December would be the

annual meeting of the society, and as business of more than usual interest and importance would come up at that time he urged that every member be present.

Adjourned.

S. E. DAVENPORT, D.D.S., M.D.S.,  
*Editor N. Y. Odontological Society.*

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#### ELECTION OF OFFICERS.

The annual meeting of the New York Odontological Society was held at the Academy of Medicine on Tuesday evening, December 18, when the following officers were elected for the year 1889:

*President*—J. Morgan Howe.

*Vice-President*—C. A. Woodward.

*Recording Secretary*—S. F. Howland.

*Corresponding Secretary*—C. F. Ives.

*Treasurer*—Charles Miller.

*Curator*—W. A. Bronson.

The Executive Committee and Editor have been chosen by the other officers as follows:

*Executive Committee*—C. D. Cook, chairman; E. A. Bogue, S. G. Perry, Z. T. Sailer, C. E. H. Phillips.

*Editor*—S. E. Davenport.

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#### FIRST DISTRICT DENTAL SOCIETY, STATE OF NEW YORK.

THE First District Dental Society of the State of New York held a regular monthly meeting, Monday evening, December 3, 1888, in the Hall of the New York Academy of Medicine, No. 12 West Thirty-first street.

The president, Dr. W. W. Walker, in the chair.

Dr. Meyer L. Rhein, Chairman of the Clinic Committee, read the following

#### CLINIC REPORT.

A stated clinic of this society was held this afternoon at the depot of The S. S. White Dental Manufacturing Company, Broadway and Ninth street.

Dr. F. T. Van Woert, of Brooklyn, inserted for a gentleman a combination gold crown on the root of a left superior first bicuspid. A gold band was formed and driven into place over the beveled root,

and the root then filled with a paste of which the following is the formula :

R Iodol, gr. x ;  
Oxide of zinc, gr. xx ;  
Vaseline carbolic, q. s. to make a stiff paste. M.

This was covered with oxyphosphate and a porcelain cusp crown cemented in position, making a very neat and serviceable operation. . . . Dr. V. H. Jackson, of New York City, filled for a lady the posterior approximal surface of a superior left central incisor with gold foil, using the pneumatic mallet and Nos. 4, 30, and 60 of Williams's rolled gold. . . . Dr. C. A. Timme, of New York City, exhibited and demonstrated the application of a thermo-cautery in the treatment of pyorrhea alveolaris, heating root-canals, and curing sensitive dentine. It consists of a hand-piece to which can be attached any shape of hollow tube platinum points. This is connected with an atomizer containing naphtha. The proper point having been selected, it is placed in the hand-piece and heated over an alcohol flame, and is kept at a white heat from the effect of the naphtha spray. . . . Dr. H. A. Parr, of New York City, exhibited two practical cases of movable bridge-work, one extending from the left superior cuspid to the second molar, and the other a complete lower bridge supported on a left molar and a right bicuspid.

#### INCIDENTS OF OFFICE PRACTICE.

Mr. H. F. Maarch, a student of the New York College of Dentistry, described his method of crowning teeth obviating the use of a band, and exhibited specimens of his work and the instruments used by him. His method is as follows: After drilling out the pulp-canal and cutting down the root even with the gum, a groove is cut around the pulp-canal with a tubular saw of a size suitable for the case to a depth sufficient to afford lodgment of a ring of metal, the top of which is made even with the surface of the root, and to it is soldered a metal cover. If desirable in any case, a pivot can be easily applied to the cover in such a way as to project into the pulp-canal. A porcelain crown is then ground into position and soldered to the cover. It is claimed that a crown made in this manner is strong enough to support one or more teeth with safety, and that it has the advantage of not irritating the pericementum.

Dr. Rodrigues Ottolengui read the following paper, entitled,—

#### TOXIC EFFECTS OF COCAÏNE.

Mr. President and Gentlemen: For reasons which I cannot explain I have always had a prejudice against cocaïne. When it was first

introduced, one of the claims made for it was that it was destined to revolutionize our profession, by acting as an obtundent in cases of sensitive dentine. This attracted me, and I made a thorough test, buying freely the extravagant drug. *I never once found it effective in any degree, applied in the cavity of the tooth.* I abandoned it. Later I was told that it was a panacea for an aching exposed pulp. Once more I experimented, and in about two per cent. of cases obtained satisfactory results. Concluding that the essential oils are more reliable in such cases, once more I abandoned it. About a year ago a professional brother in whom I have great confidence enthusiastically extolled the drug, and laughed at my story of failures. For pericementitis, he said, an injection into the gum-tissue is a specific. I left him impressed but not convinced. The day following a gentleman presented suffering intensely with acute pericementitis. I resorted to every effort to relieve him until it seemed that nothing was left but to try cocaine or, what I have occasionally found efficacious, a Turkish bath. Preferring this to the cocaine, I sent him to a bath-house. In one hour he returned with no appreciable abatement in his sufferings. Being apparently forced to my last resort, I sent out for some cocaine, ordering from a reliable druggist a four per cent. solution of Squibb's make. I injected into the gum five minims of this, passing the needle quite up to the extremity of the tooth, which was a cuspid. Immediately his pain was increased, becoming so unendurable in two minutes that I found it impossible to quiet him. Leaving the chair, he paced the floor, throwing his arms about as though in the last throes of the direst agony. I awaited ten minutes, hoping for anesthetic results from the drug, but at last pity for my patient compelled me to make another effort at giving him relief. I administered internally five grains of antipyrine, repeating the dose in fifteen minutes, by which time the pain had very slightly subsided. Fifteen minutes after he was sufficiently relieved to be willing to sit down. I administered fifteen grains of antipyrine and insisted on his lying down, and in ten minutes thereafter he was sound asleep. I allowed him to rest for an hour, then awakened and dismissed him free from pain.

After his departure I found myself in a quandary. I had never heard it even hinted that unpleasant symptoms might be expected from cocaine, and after much cogitation decided that I must have blundered and pressed my needle too far into the inflamed tissues.

Shortly after I read in a Western journal the report of a clinic at which a dentist had exhibited the drug for extracting teeth, toxic results of an alarming nature occurring in one instance. At Asbury Park this summer I related this to a friend, and he at once admitted that he had had similar experiences, in one case the result being



vomiting. The same day this gentleman operated at the clinics. He injected five minims of a twenty-five per cent. solution, and marked toxic symptoms resulted. The patient reported to me that he felt as though under the influence of gas. A profuse sweat covered his face and hands.

These few experiences awakened me to the fact that information might be compiled on this subject which would be of benefit to the profession, especially serving as a warning to those who do not, even yet, realize that a potency for evil lurks in this most valuable agent. Investigation enabled me to obtain a pamphlet prepared by Dr. J. B. Mattison (314 State street, Brooklyn), in which he gives a record of more than a hundred cases where more or less serious results have followed injection and topical use of cocaine. I shall give a record of cases which have been reported to me in answer to a card requesting such histories, which I sent to the DENTAL COSMOS.

I will first give an extract from a letter which I received, as it emphasizes the fact that dentists are using cocaine without knowledge of its danger or methods of resuscitation. After the usual opening he says, "I have searched in the dental literature and in medical reviews, and there is nothing definite about the dangers of cocaine. As you say, we hear of bad results, but nothing definite is stated to enlighten us." He then states that he wrote to the editor of one of the journals, but could get no advice; and he concludes, "The books say stimulants. What stimulants?" I think that last sentence an eloquent criticism of our text-books. Elaborate details are furnished of the pathology of a disease, but the caption "Treatment" is usually followed by a few meagre suggestions in which drugs are spoken of by the class to which they belong rather than by title.

It may be of interest for me to note that this gentleman in his letter says he has used the drug very successfully and in the following way:

"My cocaine is in one-quarter-grain pellets. I take eight of these and dissolve in twenty drops of a one per cent. solution of carbolic acid, and inject from five to seven drops." As a comment I will simply call attention to the actual dose here advised. Eight of his tablets would contain two grains of cocaine; this is mixed with twenty drops of the carbolized water, and five drops administered as a minimum dose. This is one-quarter of the whole, and so contains a half-grain of cocaine. This will serve as a comparison with the reports of cases I have to make.

Dr. L. B. LeGros, of Haverhill, Mass., sent me the following: "The patient a man aged twenty-five. Temperament sanguine; health good. Has had some stomachic trouble; do not know what. I injected thirty minims of a five per cent. solution of hydrochlorate

of cocaine in the gums. In two minutes he complained of nausea, accompanied with numbness over the entire body, which increased. At the end of five minutes the symptoms were as follows: Extreme dryness of the mouth and throat, with a desire to continually expectorate. Countenance livid, pulse very irregular, patient in a very nervous and somewhat convulsive state. Breathing hard and difficult; great constriction about the chest; could scarcely walk or stand. Became slightly delirious, and complained of intense cramp of chest and stomach. I administered brandy internally, and called a physician, who gave an emetic, not as an antidote but to allay the fears of the patient, who seemed to think that if he could vomit he would be better. I noticed a marked improvement after the administration of the brandy. The duration of the symptoms was about half an hour. The drug was given for the extraction of a tooth, which was accomplished painlessly."

Dr. C. S. Stockton, of Newark, N. J., reports the following: He was called to the house to see a patient, a lad aged sixteen. Applied a few drops of a five per cent. solution of cocaine on cotton to the gums prior to extracting left inferior sixth-year molar. The tooth was painlessly removed, but after extraction the boy suffered so much that Dr. Stockton was tempted to apply the cocaine a second time to relieve him. In one minute a violent contraction of the right arm and leg, and extreme rigidity, ensued. The limbs were so fixed that it was impossible to extend them. Face was livid, and violent chills were felt. Notwithstanding the alarming symptoms, the patient remained mentally calm, and assisted as far as possible in the efforts made for his relief. Raw brandy administered internally and friction proving ineffectual after half an hour, the boy was submerged in a hot bath, which speedily dispelled the effects of the drug.

Shortly after my card appeared in the DENTAL COSMOS, I received anonymously a newspaper dated at New Orleans. In it I found a marked paragraph alluding to a case of cocaine poisoning, and pinned to the same a clipping from some other paper containing a similar paragraph. The second I will give:

"Dr. Chas. F. Underhill, at one time one of Cincinnati's most eminent physicians, has just been sent to an insane asylum a raving maniac from the effects of cocaine. Being among the first to introduce the newly-discovered drug cocaine into his practice, he soon became a slave to it. It is only just to the eminent doctor to state that he was a great sufferer from insomnia. He is now an utter wreck."

As the other paragraph was not sufficiently explicit, I wrote to a physician named and also to the editor of the journal, asking for the name of the dentist, that I might communicate with him. Weeks

passed, and I had given up expecting any further information, when to my surprise my unknown friend sent me a second copy of the New Orleans paper. In this, in an article a column long, the news is given that the patient had begun suit for ten thousand dollars for injuries sustained by injection of cocaine at the hands of a dentist. An abbreviated quotation is as follows:

"The petitioners allege that George P. Maloney, who is engaged in the practice of dental surgery, is justly indebted to them in the sum of ten thousand dollars. That on the 29th day of August, 1888, one Pauline West went into the office of said G. P. Maloney to have a tooth extracted. That in order to do it without pain, as said Maloney said he could and would do, he administered to her hypodermic injections of cocaine, a very powerful and dangerous drug, and in so large a quantity that instantly the said Pauline West was paralyzed to such an extent that when she attempted to leave the chair she fell to the floor, and for several hours remained in that condition, being unable to stand. Petitioners further allege that they believe Mrs. West's system is permanently injured by the dangerous drug, and her health injured through the carelessness, imprudence, and want of skill of Dr. Maloney." Further on is the following statement of Dr. Maloney's:

"The lady declared she wished cocaine administered, saying she had had the drug used previously. She also stated that she was keenly sensible to its effects, the last operation having rendered her ill nearly three weeks. With these facts as a guide, Dr. Maloney proceeded to inject a small quantity of a weak solution—two per cent.—in the gums. The lady demanded that more of the drug be used, as the gums still ached, and when the doctor demurred got up from the chair, the tooth not having been extracted. At this time she stated that she felt ill. A moment later, after she had passed out of the office into the hall, the doctor was startled to hear a piercing scream come from that direction, and hastily going to the spot found the lady had fallen unconscious." I have not as yet learned the result of the suit.

Dr. N. L. McDonald, a dentist of Newark, in this State, sends me four cases:

"Mrs. B., accompanied by her husband, wished a lower bicuspid removed. Administered hypodermically twelve drops of a four per cent. solution. Immediately after extraction of the tooth patient became rigid, convulsive, and breathing was suspended. Used remedies indicated in syncope. Patient placed in a recumbent position as soon as possible, considering the muscular rigidity. In ten minutes she was resuscitated, but soon lapsed into unconsciousness again. This was repeated until a physician was deemed advisable. One being called, he administered ether until convulsions were



quieted, and she was finally able to leave for her home, having being ill for four hours. It is only fair to state that the lady's husband considered her subject to similar convulsions, though never before of such duration.

"Mrs. H. Administered hypodermically twenty drops of a four per cent. solution and removed three teeth. Experience similar to last related, and similar history of predisposition to fainting-spells. There was some delirium in this case, patient talking wildly on all subjects; also numbness of the feet and tingling in the hands; lapses into unconsciousness, accompanied by profuse sweats. Friction of extremities, and stimulants, finally enabled her to leave the office after five hours.

"Miss V. Injected twelve drops of a four per cent. solution. Result, rapid breathing, rigidity, unconsciousness. Similar treatment and free use of brandy enabled her to leave in two hours. On reaching home became seriously ill, and after a severe sickness narrowly escaped death. Her physician states that she inherited an hysterical temperament.

"Mrs. Van A. Similar dose and similar results, except that in this case toxic symptoms persisted for ten hours. Seemed to be possessed by a 'don't care' feeling. Would seem about to leave the office when she would suddenly lapse into unconsciousness, from which it would be most difficult to arouse her."

Since the above cases, which occurred in 1886-87, the doctor has had no further serious cases, and thinks it due to the fact that he avoids hysterical patients when such a history is known, and in doubtful cases administers a half-drachm of brandy previous to using the drug, as he considers it a heart-depressant. Says the most serious result under this method of precautions is that occasionally a patient becomes hilarious, as from a glass or more of wine, and is readily restored from a crying spell by valerian or ammonia.

The following five cases were sent to me by Dr. Barker, the first having occurred in his own practice, and the others are kindly supplied by his physician, Dr. Welch, both of Brooklyn:

"Case 1. Age about thirty—female. Injected fifteen minims of a four per cent. solution and extracted a tooth. Fifteen minutes later she was seized with a sensation of weakness; the extremities were cold, eyes rigid, and face bluish-white in color. Pulse weak and small, heart-sounds faint, and great physical weariness, accompanied by the general symptoms of an impending collapse. Skin cold yet moist, and eyes became glassy. These symptoms are in general the symptoms of cocaine poisoning (this is Dr. Welch's opinion), with differences peculiar to each case. If death ensue, patient dies from paralysis of the heart-muscle."



Whisky was freely given, and when Dr. Welch was called he gave a few drops of nitrite of amyl on a handkerchief and allowed her to inhale it till the pulse showed the usual result. This was repeated every fifteen minutes, and in about two hours patient had fully recovered. Of this case Dr. Welch says, "This lady had been suffering from nervous prostration for some time previous to her visit to the dentist, and this condition, though not existing at the time, possibly augmented the symptoms."

"Case 2. Mrs. B., æt. forty-six, had been a sufferer from asthma for a long time, and was advised by the attending physician to use a solution containing four per cent. of cocaine hypodermically, also to use a pill containing one-eighth of a grain every three hours, the hypodermic to be used as the paroxysms came on, in ten to fifteen minim doses." At first the relief was immediate and pronounced, but after some time was not so effective as the patient wished, and she increased the dose, taking two pills and injecting thirty minims of the solution at intervals of half an hour. When Dr. Welch saw her she had taken a total quantity of three and one-quarter grains in one and one-half hours. To continue in his words, "She lay in a condition of half coma, half stupor; the body quite rigid, the face drawn down, eyes wide open and staring, eyeball hard and resisting, pulse small and thready, heart-sounds weak and slow, inspirations from six to eight per minute, evidently impending collapse. This seems a small amount of the drug to produce such results, but the drug is one which cannot be used too carefully, and never gives exactly the same results in two succeeding cases. Immediately in this case I injected thirty minims containing equal parts of whisky and aromatic spirits of ammonia, repeating every twenty minutes, and during the intervals applying five or ten drops of nitrite of amyl on a handkerchief, allowing her to inhale it. In about one hour from the first administration of remedies she had a better pulse, color returned to the face, and general improvement ensued. Gave her a strong whisky punch and left her. Six hours later she was comfortable, heart regular, inspirations normal. She has since taken the drug for the same complaint with beneficial results, but care is used as to size of dose.

"Case 3. Miss R., æt. seventeen. Anemic, thin, and highly nervous temperament. Had been using a six per cent. solution of muriate of cocaine in the proportion of one drachm of the solution to four drachms of water put into a spray apparatus, and having the throat and fauces thoroughly sprayed three or four times daily." (There would be about three and one-half grains in the five-drachm solution, and the solution would be less than two per cent.) "The condition was a very painful pharyngitis, which was relieved by the

spray. Patient concluded that by increasing the dose of that which afforded relief she might effect a cure. One day she used three teaspoonfuls of the six per cent. solution and one teaspoonful of water, and sprayed the throat, using it all in about fifteen minutes." (This was about a four per cent. solution, but the whole amount contained ten and one-half grains of cocaine.) "In about fifteen minutes she was almost unable to breathe, the walls of the pharynx being drawn nearly together. She was in great danger. Symptoms almost identical with those from aconite poisoning. Face and lips bluish, pulse weak and small, eyes set and staring, unable to articulate or utter any sound. Treatment as before: inhalations of amyl and injections of whisky and ammonia. In addition placed the two poles of the battery to the sides of the neck and kept up a moderate current continuously, using sponges dipped in warm water as electrodes. This treatment was efficacious in resuscitating her in about two hours, and she finally recovered. The pharyngitis was subsequently cured without cocaine.

"Case 4. M. V. B., male, æt. fifty-two. Had been using hypodermics, twenty minims of a four per cent. solution, for neuralgia, for the period of one year. This dose represents about eight-tenths of one grain of cocaine. Had by this time become an habitue, and was taking thirty minims every five hours. Increasing the dose to thirty minims every two hours, he was taken suddenly, about one hour after second dose, with a spasmodic twitching of the facial muscles, faintness, giddiness, etc., all totally different from his previous experiences. Then ensued numbness and loss of power, pupils dilated, and breath came in short gasps. I found him one and one-half hours later in a state almost comatose, skin blue, lips drawn tightly together and blue; very small pulse, so small that it was almost imperceptible. Had been given up as dead, but I decided to use the battery. Stripped him, and laying him face downward swept the wire brush up and down the spinal column three or four times at intervals of from three to five minutes, meantime injecting whisky and ammonia. In thirty minutes he had sufficiently recovered to drink a stiff dose of whisky, and became conscious in two hours. Afterwards had a severe chill and was confined to his bed for two weeks, during which time he had no cocaine administered nor did he care for it.

"Case 5. A case is reported in which death ensued from the injection of one drachm of a twenty per cent. solution. The patient was lying on the table when the injection was made with the intention of performing internal urethrotomy. The syringe had scarcely been withdrawn when the patient made a foolish remark; the muscles of his face began to twitch; the eyes were staring, pupils dilated,

respiration interfered with, and ending in a violent epileptiform spasm lasting for some seconds. These convulsions were continued with increasing violence several times a minute. The respiratory function was the first to fail; the heart's action became irregular, the entire body cyanosed, and in twenty minutes the man was dead."

I have but little to say in conclusion. Personally I have had but slight experience with the agent, either for good or evil. I will say, though, that I have injected the drug about fifty times, and have never once seen anesthetic results. On the contrary, I have found soft tissues more sensitive, and have frequently produced extreme pain where none existed previously. I do not wish to be understood as saying cocaine is not an anesthetic. The evidence in that direction is overwhelming. But I make the assertion that it is less reliable than has been reported, and many times when it may seem quite efficacious the anesthesia is, in my opinion, due to the reputation the drug has attained. This of course seems a ridiculous statement, but we must all speak from our own observation, and I have obtained better results by topically applying three drops of tooth-wash than I have from cocaine. I have in this way painlessly extracted teeth in about fifty cases, which is equal to the number of failures I have had with cocaine. In this way I once removed ten roots for a highly nervous person who was afraid of gas. The only time I ever obtained local anesthesia from cocaine was once when I did not use it at all. A lady presented with a decayed tooth, the dentine being exquisitely sensitive. Several attempts to prepare the cavity resulted in the request that I use cocaine. I said it would do no good. She insisted, saying she had had it used before. I had thrown away all my cocaine in disgust, but determined to humor her. I placed a pledget of cotton saturated with warm water in the cavity, and in two minutes she reported less pain from my instruments. She then suggested that I use cocaine hypodermically. I injected into the gum five minims of warm water, and in five minutes she allowed me to use the engine and complete the work, and went away delighted because she had converted me to the use of cocaine. In this connection a short quotation from a letter to the *Review*, written by Dr. Hugenschmidt, of Paris, will be pertinent. He says, "I gave the history of a woman who had been previously told of the accidents produced by cocaine, and for whom I injected ten drops of distilled water, telling her it was cocaine. She presented all the symptoms which had been described to her, and fainted for nearly half an hour."

Dr. Hugenschmidt argues from this that cocaine should not be administered to any who are frightened, and continues:

"I explain this apparent increased physiological action in fright-



ened persons by the fact that their cerebral circulation previous to the injection is already, on account of their fear, in a state of more or less pronounced anemia, as is shown by the symptoms presented: pallor of face, coldness of the surface of the body, fainting, etc. If to such a patient in a state of cerebral anemia you give a drug like cocaine, which is a stimulant of the vaso-constrictor filaments of the great sympathetic, producing cerebral anemia, you must unavoidably produce the train of symptoms encountered in this condition."

To those who would still use the drug,—and undoubtedly there is a sphere in which it will be useful,—I have but a few words of caution. Choose for patients those of sanguine temperament, and in good health. Avoid the nervous, the hysterical, and, as Dr. Hugen-schmidt says, those who have any dread of the impending operation. Do not use cocaine for pregnant women. Never allow even the weakest solution to drip down into the fauces: a case of death from a two per cent. solution is on record, and I have given you the history of serious symptoms resulting from constriction of the pharyngeal muscles. Never use the drug in the most favorable-appearing case, without having ready at hand the needed restoratives. These are brandy, whisky, aromatic ammonia internally or five minims of carbonate of ammonia injected, nitrite of amyl, digitalis, ether and chloroform (in cases of convulsions), and if needed the battery. Hot sinapisms over the heart, and friction, will often be indicated.

Never give the drug at all except where absolutely indicated, and then use every care, and expect and be prepared for toxic results.

President Walker. Gentlemen, this paper is now open for discussion. Dr. Atkinson, we would like to hear from you on this subject, if you please.

Dr. Atkinson. I do not know that I have experience enough to entitle me to make a speech upon the subject. I think that we have had only the unfavorable side of it presented to-night, but I am so impressed with the uncertainty of the action of this remedy that I use it but very little. In the little experience that I have had with it I have not had any very serious results, nor any very marked intoxication, or hilarious feeling, from its use in small doses. The lesson that I would gather from the reading to-night is caution, and a deeper study of how remedies behave in the different temperaments, and in the different conditions of persons of good wholesome temperament. I do not know enough about the subject to dogmatize at all.

Dr. S. Freeman. I have experimented with cocaine upon myself, taking eight grains internally after lunch, at five minutes of one



o'clock. At about one o'clock I felt a burning sensation of the lips and mouth. At about ten minutes after one, being in a reclining position, my pulse was 86. At fifteen minutes after one my pulse went up to 94, and I had no feeling in the extremities. I inserted a needle in the calf of my leg and in the forearm without having any feeling; there was dilation of the pupil of the eye, and my face was pallid. All these symptoms passed away about three o'clock, at which time I was able to attend to my business without any ill effects whatever.

Dr. E. Parmly Brown. As Dr. Atkinson says, I believe we ought to be cautious in the use of this drug. I have advocated that right along. I have said that experimenting should be the work of some single individual who is capable of doing it. Let the experimenters with these powerful drugs and poisons be as few as possible, and when their experiments have reached some definite and practical result, then the profession may take them up and not till then. It is just the same with implantation as it is with cocaine. Dr. Osmun, at a meeting of the Brooklyn society, three or four years ago, said that he had permitted Prof. Knapp to introduce cocaine into his eye for the purpose of extracting a cinder. He told me this three or four months after the extraction of the cinder, and he said, "The side of my head seems to be paralyzed and cold, as if frozen." Whether that effect is entirely gone from Dr. Osmun's face or not to-day I do not know.

While in Europe this summer, in talking with Dr. J. L. Williams one day he said, "I would like you to try some cocaine on this dentine and see if it will have any effect." He got some cocaine tablets, and we experimented with it. It did not seem to do any good. I had some tablets, and when I got home I had a case one day in which I diagnosed a dead pulp. I drilled into the tooth, and the young lady thought it was not dead. I took some cocaine and experimented with it, very carefully; and I got that pulp out, in the presence of my son and one other witness, without a particle of pain. I let the cocaine work its way up into the tissue, and gradually removed the pulp.

From the pioneers in cocaine I have learned the lesson that even a four per cent. solution is dangerous with some patients. "What is one man's meat is another man's poison." To-day I had in my chair a lady from New York who has been my patient for over eighteen years; she has the most sensitive teeth, and every nerve in them is living; an entire, perfect set of teeth. She is hysterical, and has had St. Vitus's dance all her life. After the experience which I have learned from the pioneers of cocaine, I found that if I used perhaps less than one per cent. in combination with a weak solution

of carbolic acid and oil of cloves I may produce some good effect upon the dentine, and then the dentine will not be apt to be injured by hydrochloric acid. To-day I was cutting the buccal surface of a left lower wisdom-tooth. The patient was writhing in agony, but she said, "Go ahead." I had put in two amalgam fillings; they did not suit me, and I proceeded to cut them out. I cut away with corundum disks until I could not cut any longer. Then I used less than a one per cent. solution of cocaine in combination with a weak solution of carbolic acid and oil of cloves, leaving it in for about two minutes. Then I was able to cut again for two minutes with the bur. I cut those two cavities into one, opening the entire buccal surface of a large lower molar. At last she said, "That is getting hot." She made no complaint of the pain except that caused by friction. I have worked for this patient for seventeen or eighteen years, and never before did I cut into a tooth in her mouth without being entirely exhausted. I made one more application, and one more cut: I made some undercuts, and succeeded in putting in a gold alloy amalgam filling, covering the entire buccal surface of the tooth. There is a tendency to recession of the gums in her mouth; the cervical decays of the enamel are large along the margin of the gum, but the dentine inside is as hard as a flint.

It may be that a very weak solution of the drug will produce sufficient anesthesia or obtunding effect to be of value.

Now I would say that the same thing holds good in regard to anesthetics in general. I was born in this very month of December, 1844, when Horace Wells discovered anesthesia, in Hartford. I have been very cautious in the use of nitrous oxide. I studied with Colton as far back as 1866. I find to-day dentists give ether and chloroform to patients, and if twelve intelligent men should sit as a jury upon the dentists who administer these dangerous anesthetics for the extraction of teeth, when it is known that nitrous oxide has been found to be almost absolutely harmless, they would not be likely to acquit a man whose patient had died under ether or chloroform. If the dentist escapes conviction, it is because the jurymen are kind-hearted and let him off. I have used nitrous oxide in extracting teeth for twenty years, and I have used it many times every week for eighteen years in Flushing. I make the gas myself, and every time I make it a fresh wash is put in the box. I am going to have a clean record, and if ever anything happens in my office I will be able to show that I have taken every precaution. I have had no accidents yet, and no patient has been detained in my office over two or three minutes after the extraction has been done.

Dr. Littig. I use cocaine with advantage, not hypodermically, but applied to sensitive dentine as an obtunder. I make a saturated

solution, or as much as will dissolve in glycerin. It is the only preparation of it that I have had success with. Whether the effect is due to the glycerin or the cocaine I am not exactly prepared to say, but that preparation does the business.

Dr. Rhein. Mr. President, the aspect of the cocaine question that has been presented by the essayist this evening is certainly one which should be very carefully considered by all of us; and what I have to say is not to object to its use in dentistry, but that we should be very cautious in the use of the drug, exercising extreme care in the selection of the patients for whom we prescribe it.

It is rather intimated by the essayist that cocaine has not the anesthetic property which many maintain that it possesses. The effect of the drug varies with different persons, therefore the evidence as to its anesthetic effect is not uniform. I was a skeptic on the subject of the anesthetic effect of cocaine for a long time after it was introduced, although using it constantly; but recently I have become convinced that cocaine can be administered hypodermically and teeth extracted without any local sensation whatever.

In regard to the toxic effects of cocaine and the consequent danger that is incident to its use, I think there is no question as to the truth of the statements made by the essayist. We might as well, however, give up every powerful remedy in the pharmacopœia if this is to be the argument in favor of abolishing the use of this drug. The same thing is liable to occur with opium and many other powerful remedies which we are using all the time. I have had a number of cases where the very bad symptoms which Dr. Ottolengui mentions presented; but I find that we possess very powerful antidotes, such as nitrite of amyl, and brandy, and various other stimulants, which will dispel these ill effects; and they should always be at hand for immediate application. No one should administer cocaine unless he has nitrite of amyl at hand as an antidote in case of need. Too frequently in cases of toxic effects of these drugs the antidotes must be sent for, and there is so much delay in obtaining them that the toxic effects become much more alarming than they otherwise would.

Another point which the essayist brought out, and which I have found substantiated in my practice, is the importance of avoiding the administration of this drug to patients who are afraid of it. There is no question but that fear of producing an anemic condition of the brain renders a person especially liable to the toxic effect of the drug, and patients who have this fright are the ones we should not use it on. I had a patient of that nature a short time ago for whom I was very anxious to remove a badly-diseased root. I determined to use cocaine, but I did so without the knowledge of the patient. I removed the root, and he was a very much astonished man. I told

him afterwards what I had done, and he was delighted. I had very bad effects follow the removal of another root for the same patient on a later occasion, when he was naturally aware of the nature of the contents of my hypodermic syringe. The sequence of the prior use of the cocaine had been of such a happy nature that I paid little heed to his blanched countenance. No sooner was the root removed than serious toxic symptoms became prominent. Brandy was sufficient in the case to relieve what appeared at one time to be an alarming condition. He admitted later that he had come to the office badly frightened, due to the horrible tales which he had heard of the baneful effect of the drug.

Dr. Ottolengui. Dr. Rhein denies that the patient's mind when under the influence of cocaine assists in the anesthesia, and yet he admits that the dread of cocaine occasions unfavorable results. I think if the latter be true the converse must be true also.

I did not say that cocaine was not an anesthetic. I think the evidence in that direction is overwhelming.

The regular meetings of the society will hereafter be held in the parlors of the Academy of Medicine on the second Tuesday instead of the first Monday of each month; and the by-laws were amended accordingly.

Adjourned.

B. C. NASH, D.D.S., *Secretary*.

## UNION CONVENTION OF THE FIFTH, SIXTH, SEVENTH, AND EIGHTH DISTRICT DENTAL SOCIETIES OF THE STATE OF NEW YORK.

(Continued from page 50.)

### FIRST DAY—*Evening Session* (Continued).

DR. FRANK B. DARBY, Elmira, read a paper describing a case of "Mouth-Breathing," and the means he adopted to cure it.

Adjourned till 2 P.M. to-morrow.

### SECOND DAY—*Afternoon Session*.

The convention met pursuant to adjournment, Dr. F. E. Howard, president of the Eighth District Society, in the chair.

Dr. W. C. Barrett, Buffalo, showed and explained Taggart's disk-maker, which he had found a great convenience. His office girl now makes all his disks and points. The advantage of using this appliance is that one can have new and sharp disks at all times, and the expense of making them is almost nothing. Dr. Barrett also mentioned with approval Brophy's and Miller's matrices, and then showed some specimens of ancient dentistry, dating back seven



hundred and fifty years before Christ. Their authenticity is undoubted. He has the certificate of the officer in charge of the exhumation. They were taken from an ancient Etruscan tomb. The laws in Italy prescribe just how the exhumation of these ancient relics shall be prosecuted, and place the work in charge of specially appointed officers who are compelled to see that the regulations are carried out. These specimens date from about the time of the founding of Rome. They are of more than usual interest, as they bear unimpeachable testimony on some interesting points connected with the teeth of man. Dentists of to-day usually entertain the idea that the prevalence of diseases of the teeth is to be attributed to the altered methods of living, to the modes of cooking food, to changes in the manner of life, etc. Some years since the speaker had examined about two thousand ancient skulls, more especially with reference to evidences of dental diseases. This examination at once demonstrated conclusively that all the diseases of modern life, except syphilis, were as rife in ancient times as to-day. Two of these teeth shown this evening prove the existence of pyorrhea alveolaris in teeth seven hundred and fifty years before the Christian era.

Dr. Barrett then related the case of a boy who had been run over, sustaining two fractures on the right side of the jaw. The surgeons in attendance called him in, acknowledging that they did not know how to proceed. By a process of exclusion he arrived at the opinion that the jaw was fractured across the ramus, and he reduced it in a few minutes by molding a gutta-percha splint. The case has progressed satisfactorily, the surgeon says.

Dr. A. P. Southwick, Buffalo, in opening the subject of "Vulcanizing," said that he had been over the ground a good many times, and he only cared to say a few words on the effects of heat on rubber. Rubber is a vegetable substance, and will stand so many degrees of heat, and no more, without injury to its texture by causing porosity. What shall be done to prevent its becoming porous in the process of vulcanization? The answer is, don't burn it. Vulcanizers have been made for twenty years with the idea of saving the time of the dentist by doing the work quicker. They are provided with thermometers which are set in mercury baths let into the chamber of the vulcanizer. A thermometer so placed will vary probably twenty degrees from the actual temperature of the steam-chamber; so that 320° F. by the thermometer means 340° F. actual temperature in the chamber where the rubber is placed. Rubber will not stand over 300° F. without injury. Any temperature over that is detrimental to the vitality of the rubber. Dr. Carroll, in his remarks last evening, gave as one of his principal objections to rubber as a base for artificial dentures, its liability to

misfit. The speaker thinks that is a mistaken idea. It is not the fault of the rubber, which when fixed in one shape by heat remains so until its shape is changed under heat and so held until cold. All things expand under the application of heat. If a block of teeth is removed from a set made as they usually are, after it has been worn, a space will be found between the teeth and the rubber filled with the débris secretions of the mouth. The lowest heat at which vulcanization can be accomplished is best for the fit, because there will be less contraction in cooling than if the rubber has been subjected to a higher temperature. Dr. Butler, in his paper, attributed misfits in the early days to the imperfection of the machines used for vulcanizing, but the fact is that every man has made misfit plates when he could not explain the reason why, and then charged it to everything but the correct cause, which was too much heat. [Dr. Southwick here showed two plates, one vulcanized at 280° F., the other at 340° or 350° F. The difference in their texture was at once apparent.] 280° to 285° F. is the highest temperature that should be employed, and the time should be two hours. By adopting this plan, lower heat and longer time, you will come just that much nearer perfect adaptation. If the plate won't stay up when placed in the mouth, how is it to be remedied? Save your casts, and you will be prepared to correct faults of this kind. How shall the misfit plate be made to fit the cast? This difficulty does not occur with plain teeth; only where blocks are used. If the plate won't go on the cast it takes but a moment to warm it, and when it approaches anywhere near the heat of vulcanization, it drops on easily. If it is then held on the cast till cool, there will be as perfect adaptation to the mouth as the patient can wear. In brief, the best way to make a rubber plate is to vulcanize at as low heat as possible, taking all the time necessary, and when done vulcanizing, cool down the vulcanizer before taking out the plate.

Dr. Southwick wished to get the expression of the societies on copper amalgam. He has used it almost exclusively for a year,—pure copper and pure mercury. No one man can take a new material and of his own experience form a correct conclusion about it. He had started with copper amalgam nearly a year ago. Ordinary amalgam is a fraud as a tooth-saver. In six months from the time it is put in a little line is seen around the edges of the filling, caused by its contraction. Copper amalgam comes warranted not to shrink. He does not care if it does discolor, if it is a tooth-saver, and his experience is that with it he can save teeth that he cannot save with anything else. He prepares it for use in the palm of his hand, as being a more satisfactory way than any other he has tried, because it insures more complete assimilation. He had re-

cently examined a copper amalgam filling he put in a year ago, and its edges were just as perfect as when put in.

Dr. R. Walker, Owego, as one who has had some reputation as a manufacturer of amalgam, does not take exception to the strong indorsement given to copper amalgam by Dr. Southwick, who has to-day told us what copper amalgam is,—pure copper and pure mercury. He thinks, however, that Dr. Southwick is a little strong in his condemnation of amalgam as not doing any good in the saving of teeth. The speaker had learned on entering the profession that gold was the only proper material with which to fill teeth, but he had long ago found out that this was incorrect. He has teeth in his mouth now which were filled with amalgam thirty-five years ago, which would seem to be a very satisfactory test; but if he can get a better material he wants to use it.

Dr. L. S. Straw, Newburgh, indorsed Dr. Southwick's statement with regard to the efficacy of copper amalgam, which he has been using some six or eight months with such satisfaction that he has almost entirely discarded other amalgams from his practice. He has found the Canada amalgam too soft, and he has found its hardness improved by mixing with filings of other amalgams. Dr. Southwick's method of rubbing it in the hand till the mass is more completely molten appears a good idea, and he will try it.

Dr. Barrett, when in Montreal about a year ago, first saw the pure copper amalgam. It is electro-chemically deposited, and is therefore in as pure a state as can be obtained. He had used it to some extent, though he is not an amalgam man, and introduced it in the city dental society. It works just as soft as putty.

Dr. Southwick. In grinding copper amalgam in a mortar, the mercury is not so well incorporated as when it is put in the palm of the hand and rubbed with the finger. Then, when it is thoroughly mixed,—not much motion of the finger is required,—squeeze out the excess of mercury, and it is ready for use. It is a little slow-setting, but careful manipulation will overcome this to some extent. One word of caution he would give: Don't put it into a tooth if you expect to have to remove it again.

Dr. R. E. Sunderlin, Syracuse, had a case where the patient complained that the filling—copper amalgam—caused considerable pain.

Dr. Southwick. You will occasionally find that in some temperaments, but such cases are exceptional.

The subject was passed temporarily, and Dr. M. L. Rhein, New York City, read a paper entitled "Studies of Pyorrhea Alveolaris, No. II."

For ordinary cases the treatment is well understood. It is absolutely essential that every particle of deposit of whatever form

shall be removed, and too much stress cannot be placed on the necessity of teaching patients how to keep their teeth clean. Invariably, where the results of treatment have not been satisfactory he has found that patients were not cleaning their teeth properly. After that, in very mild cases, all that is necessary is the injection into the pockets of solution of mercuric bichloride in hydrogen peroxide, 1-500. Considerable pain to the patient can be averted by first warming this. Following the germicidal injection applications like the Robinson remedy should be made, which after destroying the superficial structure stimulate the growth of new and healthy tissues. In over-stimulation a solution of tannin and glycerin is efficacious as a soothing treatment. Where the cause is a constitutional affection, general treatment is to be combined with the local. All the forms of tonics are generally indicated. Neuralgic symptoms yield readily to small doses of antipyrin or antifebrin, the former being preferred as the safer remedy. This general treatment will do when the pockets have not advanced to too great a depth, beyond which point treatment has heretofore been considered useless.

On January 18, 1888, the writer presented, at a meeting of the First District Dental Society, a method for the cure of the old chronic forms of pyorrhea when the pockets had advanced almost to the apices of the roots, the teeth had become so loose as to be almost ready to tumble out of their sockets, and the soft tissues so hypertrophied as to present a most disgusting spectacle.\* The cause of the failure of ordinary treatment is the excessive motion present. If the teeth are held immovably in position, the reproduction of tissue is as certain to proceed as in the milder forms of the disease. Binding wire and ligatures are not only uncleanly and too temporary, but they permit just enough motion to prevent the permanent adhesion of the new protoplasmic formations. When no teeth are missing the best results are obtained by making a groove through the cutting-edges of the teeth and forming a continuous gold filling all round, or a bar can be laid in the groove. It was freely predicted that the case (models of which are passed around) shown at the meeting above referred to would not stand a year's wear. It is still in the same first-class condition. The soft tissues are now as near the normal type as a man of the patient's age could expect. Another case of extreme severity where sufficient time has elapsed to prove the beneficial results of this treatment presented in February last. All of the superior teeth were suffering from a mild form of pyorrhea, except the right central incisor, which was elongated one-sixth of an inch beyond the left central, and the root of

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\* See DENTAL COSMOS, March, 1888, page 184.



which was exposed on the labial side almost to the apex. The pulp was living, although the tooth was pushed to one side and so loose that he was tempted to take it out with his fingers. The crown was trimmed even with the adjoining central and united to it with a gold filling in a groove across the cutting-edges. The tooth is now doing good service.

This method has been found specially useful when some of the teeth are missing. Properly constructed bridge-work can be anchored in teeth in the last stage of pyorrhea, and not only will the patient have the benefit of the bridge, but the diseased teeth or roots can then be very easily brought into a healthy condition. In places out of sight, in the posterior portion of the mouth, it is often well to bridge a small intervening space with a heavy bar without a porcelain face. The rough working model passed around shows the case of a gentleman, aged fifty years, who presented in March with general pyorrhea. All the teeth yielded readily to treatment except the right superior bicuspids, which were very loose, and the right superior second molar, the palatal root of which was entirely exposed. The loss of the superior first molar undoubtedly contributed to the condition of these teeth. They were made perfectly firm and useful, and the entire occlusion perfected by placing a gold bar, extending from the molar to the cuspid, in a groove cut through the fissure of the bicuspids, and continued in a straight line nearly across the palatal surface of the cuspid. The bar was broad and heavy at the molar, where it was bent at a right angle to enter a cavity from which a large amalgam filling was removed to make place for it, and became smaller as it passed through the bicuspids to the cuspid. It was anchored in the molar with oxyphosphate, over which a gold filling was built, and the portion through the bicuspids and cuspid was carefully filled around with gold foil flush with the enamel. The bar itself across the space made by the loss of the first molar made an excellent occluding surface.

Dr. Rhein's paper closed with the description of a case treated after the same method by Dr. Rodrigues Ottolengui. When the treatment was begun, three wisdom-teeth had been lost from pyorrhea, and the inferior sixth-year molars were also missing. All the other teeth were sound and clean except the inferior second molars, which were isolated and unsupported, the remaining wisdom-tooth (the superior left), around which an explorer could be passed entirely without meeting any attachment, and its neighbor, the second molar, which was affected only on the posterior aspect and was quite firm. After removing the deposits, a groove was cut from the center of the superior left second molar to the center of the wisdom-tooth. About one-third of the depth of this groove was

filled with gold foil, and on this was placed a strip of 22-carat gold (No. 28 gauge), with its edge saw-cut, and around and over this gold was impacted and the filling completed with heavy gold. The same day the pockets were treated with Robinson's remedy. Subsequently they were treated with peroxide of hydrogen and a 1-500 solution of bichloride of mercury mixed in equal parts, and as they began to heal with tannin and glycerin. The inferior second molars were bridged as follows: A band was cut to fit each, with two steps to fit into grooves in the crown posteriorly and anteriorly, and a clasp for each of the bicuspid. A molar was then backed and soldered between the band and clasp. When ready, the two bridges were set with oxyphosphate and further secured by gold screws which passed through the bands and the teeth on both the buccal and lingual sides. Since placing these three bridges the teeth have improved marvellously, and Dr. Ottolengui states that both he and his patient are satisfied that they could not have been saved in any other way, as one at least was on the verge of extraction.

(To be continued.)

#### ST. LOUIS DENTAL SOCIETY.

THE St. Louis Dental Society held its annual meeting at the office of Dr. A. J. Prosser, 3109 Olive street, St. Louis, Mo., Wednesday evening, January 2, 1889.

The following officers were elected for the ensuing year: A. J. Prosser, president; J. Warren Wick, vice-president; Jessie E. Grosheider, recording secretary; William Conrad, corresponding secretary; Henry Fisher, treasurer; H. H. Keith, John G. Harper, and J. B. Vernon, publication committee; J. B. Newby, Wm. N. Morrison, and A. H. Fuller, committee on ethics and elections.

There were seventeen meetings held, and fourteen papers presented during 1888.

WM. CONRAD, *Corresponding Secretary*,  
321 North Grand Avenue, St. Louis, Mo.

#### PHILADELPHIA DENTAL COLLEGE ASSOCIATION.

THE junior class of the Philadelphia Dental College in October last organized an association for publicly discussing matters pertaining to dentistry. Meetings are held on the first and third Fridays of each month, and have thus far proved interesting and profitable. The officers of the association are as follows: Frank L. Platt, president; W. H. Morse, vice-president; I. A. Chew, secretary; Chas. Dennison, treasurer.

### MISSISSIPPI VALLEY ASSOCIATION OF DENTAL SURGEONS.

THE forty-fifth annual meeting of the Mississippi Valley Association of Dental Surgeons will be held in Lincoln Club Hall, corner of Eighth and Race streets, Cincinnati, Ohio, on the first Wednesday in March (6th), 1889, at 10 A.M.

Members of the profession are cordially invited to attend, as matters of interest will be presented.

E. G. BETTY, *Chairman Ex. Com.*,  
82 Garfield Place, Cincinnati, O.

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## EDITORIAL.

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### THE EDITORIAL FUNCTION.

THE exercise of the editorial function is so liable to occasion unjust reflections and unwarranted conclusions, that brief space may be permitted for the presentation of a few general statements :

First. It should be remembered that the editor has probably the advantage of a wider outlook than the writer. As to the acceptance or rejection of a paper submitted for publication, the editor is of necessity obliged to consider the interests of his journal and of its readers more than those of any single contributor. The duty which he owes to his subscribers outweighs the claims of business or friendship. If the periodical has a well-defined field, he cannot admit the discussion of irrelevant topics. Subscribers have paid for it as the vehicle of information in their specialty, and they have a right to complain of the use of its pages for matter not pertinent thereto. Even within this limitation if the subject be of local rather than of general interest, or if it be threadbare by frequent discussion, or be dealt with in an elementary manner, due consideration for the reputation of his journal compels an editor to respectfully decline the publication of such matter, and such considerations appeal to him as they cannot to one not occupying his vantage ground, albeit an adverse judgment is frequently as painful to the editor as it is disappointing to the writer.

Second. It would seem almost superfluous to assert that the editor is as desirous to obtain a good article as a writer can be to furnish one, and no well-written paper is rejected except for a valid reason, and after a careful survey of the situation.

Third. An editor who wishes to maintain a literary character for his journal must measure every contribution by the standard which he has erected. Judged by such standard, many articles must either be rejected or made approximately to conform thereto. A reader of even superficial culture soon catches the tone of the

periodical which he reads habitually, and if it pleases him he will not be satisfied with a lowering of its style; and though he may not possess the gift of writing well himself, he recognizes and appreciates it in others. While it may be impossible to maintain the same high tone in every instance, the rule is to keep the exceptions as near the pitch as possible.

Fourth. It should not be forgotten that good contributors are a necessity to the successful editor, and it is of vital interest to his journal to encourage and develop them. In this effort there is much laborious editorial work, credit for which the editor cheerfully waives in favor of his contributor; with a more mature judgment contributors subsequently recognize the value of an editorial revision which at the time they were disposed to resent as meddlesome. The reasons for this are not difficult of apprehension. The editor is constantly exercising the critical faculty; being practiced in the art of selection, he readily sees the merits and demerits of the paper before him, and makes honest effort to improve the author's presentation of his theme.

Fifth. No intelligent editor will claim the right to change the *meaning* of his correspondent; while on the other hand he will be solicitous to correct verbosity of style, inelegancy of expression, faultiness of grammatical construction, and to make plain, by modification, obscure or involved sentences,—in a word, to make the writer say concisely that which he had desired to say, but had failed to make clear by reason of inexperience or undue haste.

Sixth. The privilege accorded to the writer to revise proof of his contribution gives him the opportunity to correct any misapprehension of his meaning on the part of the editor, and should be accepted as evidence that there was no intention to be otherwise than helpful to him.

Seventh. Contributors to the literature of a profession should bear in mind that, so far from there being any antagonism between writer and editor, there is assumed to be a common purpose to present that which shall be creditable alike to author, editor, journal, and to the profession.

Eighth. Inexperienced writers should therefore accept editorial revision as well meant even if not well done, and intended as a corrective for faults, or what appear as such to the editor, and as an inspiration to more careful effort.

Ninth. While the foregoing summary of points submitted for the consideration of our contributors may at first reading appear egotistic, it is not meant to assume superiority, but simply to invite thought and promote a charitable feeling for those occupying editorial chairs, whose best efforts too often bring them reproach and censure where they had hoped for appreciation and thanks.



### A MONTHLY BIBLIOGRAPHY OF DENTAL LITERATURE.

WE announce with pleasure and pride that in the March issue of the DENTAL COSMOS we shall begin printing with each number a Monthly Bibliography of Dental Literature, which will be as far as possible a complete record of all the books, papers, etc., on dental subjects published during the preceding month throughout the world.

Readers of the DENTAL COSMOS will hereafter be enabled to learn the contemporary progress of dentistry in all countries so far as it is reflected by its literary productions, and will thus have ready reference to any special subject relative to dentistry treated of in medical or dental publications in whatever language.

The four pages required for this new feature will be added to the eighty pages of reading-matter, making, with the four pages assigned to a Monthly Index, a total of eighty-eight pages devoted absolutely to the interests of our subscribers,—a voluntary addition within a year of twenty-four pages.

The Subject Index and the Bibliography, as supplemental to the wide conspectus of the dental world furnished in the eighty pages of reading-matter, will render each issue of the DENTAL COSMOS as valuable as from our present stand-point we know how to make it,—a record of the current progress of dentistry so complete as to be to all intents perfect.

We shall, however, be constantly on the alert to add to it any feature that will tend to enforce upon its subscribers the conviction that to them it is a necessity.

We submit that no dentist who reads English can afford to do without the DENTAL COSMOS.

## OUR MONTHLY INDEX.

Our notice in the December number of the intention to publish with each issue an alphabetical personal and subject index, did not adequately emphasize its importance and convenience to the reader. The ordinary titular table of contents common to all journals has been long found wanting as a guide in the search for specific information. So far as we are aware, the DENTAL COSMOS has been the first periodical to incorporate with each issue such an index as appeared in our January number.

Every reader and writer will congratulate us and himself that each succeeding number of the DENTAL COSMOS will contain alphabetically arranged references to every person and subject mentioned in that issue. At the end of the year, these indices will be re-arranged and condensed into an index suitable for the bound volume.

The Cosmos still leads.

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A CORRECTION OF THE COLLEGE RECORD.

Our statement in the November issue has been editorially criticised in the *Archives of Dentistry* for December. The number of distinctively dental colleges was given as ten, and those connected with medical colleges as two.

The list published in the same number referred to, on page 841, is we believe correct with the single exception that the Missouri Dental College is not classed as a department of a medical college, as it should be, which makes the distinctively dental colleges *seven*, and those connected with medical colleges *five*.

The *Archives* editorial also claims that the Missouri Medical College instituted a Dental Department in 1866, three years in advance of Harvard.

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RHODE ISLAND'S DENTAL LAW.

THE following is an "Act to Establish a Board of Registration in Dentistry for the State of Rhode Island and Providence Plantations," passed June 1, 1888:

*It is enacted by the General Assembly as follows:*

SECTION 1. The Governor of the State shall, on the passage of this act, appoint five graduates in dentistry residing and doing business within the State, who shall constitute a board of registration in dentistry. The term for which such members shall hold their office shall be three years; except that one of the members first appointed under this act shall hold his office for one year, two for the term of two years, and two for the term of three years respectively, and until their successors shall be duly appointed. In case of a vacancy occurring in said board it shall be filled by the Governor in conformity with this section.

SEC. 2. Said board shall choose one of its members president, and one secretary thereof, and three of its members shall constitute a quorum. It shall meet at least once a year or oftener at the call of three members.

SEC. 3. Within three months from the time of the passage of this act, it shall be the duty of every person engaged in the practice of dentistry at that time in the State to cause his or her name and place of business to be registered with said board, who shall keep a book for that purpose; and persons so registering shall receive a certificate to that effect from the board.

SEC. 4. All persons, not graduates of regular dental colleges, who may desire to enter the practice of dentistry in this State, subsequent to the passage of this act, may appear before said board and be examined with reference to their knowledge and skill in dentistry; and to such as undergo a satisfactory examination certificates to that effect, signed by said board, shall be issued. All persons holding diplomas from reputable dental colleges may present the same to said board, and on such presentation shall receive certificates without examination.

SEC. 5. Each person receiving a certificate shall pay to said board the sum of \$2.00, and each person applying for an examination shall pay, in addition to the fee for certificate, if granted, twenty-five dollars, which shall in no case be returned. The fees received for examinations, registration, and certificates shall be appropriated to defray the expenses of the board of registration in dentistry.

SEC. 6. Any person who shall practice or attempt to practice dentistry in this State, in violation of the provisions of this act, shall be deemed guilty of misdemeanor and liable to indictment therefor, and upon conviction shall be fined not less than fifty nor more than one hundred dollars, for each and every offence; and such person's failure to duly register with the board of registration in dentistry shall be evidence of such violation.

SEC. 7. This act shall take effect upon its passage.



A true copy. Attest:

CHARLES P. BENNETT, *Depy. Sec'y of State.*

## ODONTOLOGICAL SOCIETY OF PENNSYLVANIA.

As announced in the January number, we had expected to present in this issue an abstract of the papers and discussions of the tenth annual meeting of this organization. The society had, however, otherwise arranged for the publication of its proceedings, which will not therefore appear in the Cosmos.

## BIBLIOGRAPHICAL.

TRANSACTIONS OF THE INTERNATIONAL MEDICAL CONGRESS. Ninth Session. Edited for the Executive Committee, by JOHN B. HAMILTON, M.D., Secretary-General. Volumes I-V. Washington, D. C., U. S. A. 1887.

The Transactions are embodied in five octavo volumes embracing three thousand eight hundred and twelve pages with an appendix of thirty-nine pages, and including many illustrations. Of this mass

of matter relating to a great variety of subjects belonging to the eighteen sections into which the Congress was divided, we note that three hundred and eleven pages of volume v—equal to nearly one-twelfth of the whole number of pages—are devoted to dental and oral surgery, as Section 18. The proportionate attendance upon and financial support of the Congress by this section was relatively even greater than is indicated by this relative preponderance of printed matter.

Our previously published abstracts of the transactions of the dental and oral section contained the gist of these, which will, however, in their complete forms, with illustrations, amply reward a careful perusal. The papers and discussions in all the sections may be profitably read by each member of every section, and as the Transactions will be received by not far from four thousand practitioners, the inter-action of so many minds upon subjects of practical professional interest cannot but greatly conduce to the advancement of all divisions of the healing art, and to a consequent promotion of the public welfare in all civilized countries. We have translated from the French a paper by Dr. Claude Martin, of Lyons, France, entitled "Trepanning of the Radicular Extremities in the Dental Alveolar Periosteum," which will appear in a subsequent number.

We should be glad if we had space for a more extended notice of this international literary monument to the cosmopolitan character of medical science as exemplified in the fraternal assemblage thus commemorated. Great credit for this auspicious result is due to the arduous and faithful labors of the executive committee and the distinguished editor.

#### PAMPHLETS RECEIVED.

Transactions of the Indiana State Dental Association, thirtieth annual meeting, held at Terre Haute, Tuesday, June 26, 1888, continuing four days. Published by the Association. Indianapolis: Wm. B. Burford, 1888.

Transactions of the Illinois State Dental Society, at the twenty-fourth annual meeting, held at Cairo, May 8 to 11, 1888. "*Artem doctrina sanitatum arte.*" Chicago: Published for the Society, 1888.

The Relation of Abnormal States of the Heart to Abnormal Conditions of other Organs of the Body. By E. M. Hale, M.D., Chicago, Ill. Prepared for the Southern Homeopathic Medical Society, and read at Louisville, Ky., October 10, 1888.

The Achievements and Hopes of Our Specialty. Annual Oration delivered before the American Academy of Dental Science, Boston, Mass., November, 1888. By Charles E. Francis, D.D.S., M.D.S., New York City.



## HINTS AND QUERIES.

**A LEFT-HAND SCREW PLATE FROM A RIGHT-HAND TAP.**—Take a piece of steel wire and cut on it a right-hand thread. File off the threads on each side, leaving exactly opposite to each other two narrow rows of threads. A is a cross section of the filed tap. B is a perspective showing the tap and its unfiled right-hand threads. After hardening and tempering the tap, drill through a piece of steel plate two holes equal in diameter to the reduced diameter of the tap. Insert the tap, and with a steady, constant push to overcome the regular right-hand lead turn it TO THE LEFT. The result will be a complete left-hand screw-plate. C shows the left-hand screw. With the same tap placed in the other hole, cut a right-hand screw, and harden and temper the plate. Then use the plate to make two right and left taps of the common kind, so that wire threaded in either hole of the plate will fit a corresponding nut threaded by the right- or left-hand tap.



Dental regulating and other fixtures or appliances not infrequently require left- as well as right-hand screws, and those can easily be made by the method described. The cut shows clearly the threads of the screw.—J. H. BEEBEE, Rochester, N. Y.

**INLAY CYLINDERS.**—I have been for a considerable time in the habit of using the roots of porcelain continuous gum teeth out of which to make cylindrical forms for inlaying purposes, and wishing recently to ascertain if I could not have such cylinders prepared for me, was informed that they were already in stock, having been suggested some ten years since by Dr. Claude Martin, of Lyons, France, and later by Dr. Wm. Sachs, of Breslau, Germany, to whose methods allusion is made in the DENTAL COSMOS for August, 1888, page 546.

In my practice I fit one end of the cylinder in the porte-polisher, and cement or clamp it securely therein. I then hold the cylinder against a corundum wheel revolved in the opposite direction, or slab, and running the porte-polisher in the hand-piece of the engine at high speed, grind a length of the cylinder equal to the depth of the cavity, until that portion of the porcelain exactly fits the cavity. This had previously been cut truly circular, and flat-bottomed, no undercut being required—for when the porcelain is properly fitted it will *not* be easily removed, even before it is cemented. After grinding the cylinder to a close fit, and marking with a fine-pointed pencil the depth of its insertion in the cavity, I remove the cylinder, and with a thin corundum disk cut a groove around it close to the pencil-mark, and so deep that a very little wrench will snap off the inlay. This I then smear with oxyphosphate cement, and quickly insert in the cavity with force enough to break off the inlay from the cylinder. Some hours afterwards, when the cement has become hard, I grind and polish the inlay flush with the tooth.

One advantage of the cylinder is the firm grip with which it is held by the porte-polisher or cement, so that the grinding may be done without danger of prematurely detaching the inlay, and thus enabling the operator by revolving the porcelain in the cavity to grind a perfect joint between the porcelain and tooth-substance. Moreover, if it is accidentally ground too small, the end can be ground off until the larger diameter is reached without disturbance of the mounting of the cylinder.—B. C. RUSSELL, D.D.S., Keene, N. H.

# THE DENTAL COSMOS.

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## ORIGINAL COMMUNICATIONS.

### METHODS IN DENTAL COLLEGE EDUCATION.

BY L. C. INGERSOLL, D.D.S., KEOKUK, IOWA.

(Read before the Joint Meeting of the American and Southern Dental Associations, at Louisville, Ky., August 31, 1888.)

EDUCATION is a term which signifies the state of the world's enlightenment and progress,—a coming up out of a low state to a higher state of mental, moral, and physical development.

It is an interesting study of history to look back over the long track of the ages and observe by what methods the world has been educated. The race is made up of individuals, each in a condition of primary independence. Hence the race as a whole can only be educated by an education of the individual members of the race. How to accomplish this successfully is the problem of the world's advancement.

Men are not like grains of wheat. When you look over a Dakota wheat-farm stretching out miles before you, you see every head of wheat like every other head; and when the threshers give the chaff to the wind and gather up the millions of bushels of grain, each grain is like every other grain, with the same possibilities of development and growth. Cadmus,—who might be styled the mythical father of dentists,—catching the inspiration of nature, thought to sow teeth, as wheat, and raise an army of men. When they came up, unlike wheat, they were of every degree of strength, endurance, adaptability, and possibility of development and service. This difference in mankind makes the problem of education a complex and difficult one. Shall it be of the individual alone, or of masses of individuals? When a number of individuals are gathered together with a common purpose to learn something that they did not know before, we call it a school. Schools are as old as human

society. When the school is gathered, the question arises, How shall it be organized, how begin, and how proceed? These are resolved into the *one* question of *methods of education*.

The school is a natural product of society; but methods of conducting it are artificial and arbitrary. It is easy to organize for educational purposes, but not easy to agree on the methods of accomplishing the object, for many do not see the importance of well-defined methods.

The true value of a school, measured by results, does not depend so much upon imposing edifices, ample equipments, and a long list of instructors named and titled, as upon the methods and manner of instruction. Methods are seldom talked of and little appreciated in our professional schools. But the method of doing anything is the all-important feature of the doing. The valued and ideal home is not constituted chiefly by a commodious house, elegant furnishing, husband, wife, and children, but by the manner of conducting the home. Many medicinal compounds are valueless unless a certain method is observed in the compounding. It is strange that even intelligent men do not more highly appreciate the importance of methods.

I had occasion a few days since to make a concrete for a foundation, and I instructed an intelligent mechanic, accustomed to the work, as to how I wanted it made. He very readily comprehended the necessity of having good cement, clean, sharp sand, macadam rock free from dirt, and clear water; but he did not seem to comprehend the importance of exact method in putting the materials together. He got the general idea that these materials were to be mixed together, but he did not comprehend that he must adopt a method that would secure a coating of cement on each grain of sand and a coating of cement mortar on each piece of macadam before shoveling the mixture into the trench, in order to secure the absolute solidity of the mass.

Every dentist knows that elegant equipment of an office will not, as a matter of course, secure good gold filling; but the value of the filling depends upon the method of putting the gold into the tooth to be filled.

Is it not time to examine our educational methods? Chief among the methods employed in our schools is the lecture system. This method of communicating instruction has the merit of great economy of time and labor, for a man can deliver a lecture to one hundred pupils in the same time and with the same effort as he could deliver the same lecture to a single individual. As an argument in favor of the lecture system, it admirably favors the lecturer. But other persons are concerned besides the lecturer,—there are

the teacher and the taught. Each pupil has an individual interest to be served. The lecture is not given for the benefit of the teacher, but for the benefit of the pupil. How are *his* interests served? Is the lecture system the best mode of instruction considered from the stand-point of the pupil?

Popular lectures for great masses of individuals, as in a political campaign, may be a necessity; but the political education of the people would be meager indeed were it not for the daily and weekly press as text-books for study.

In no period of the world has the giving of solid and permanent instruction been intrusted to the lecture system. It is adapted to but two classes of mankind,—to children too young to read, and to those already well instructed and educated.

To derive benefit from lectures the pupil must have a disciplined mind, quick perception, ready analysis and generalization of thought, comparison, and a retentive memory. But unfortunately this is not the class that fill our colleges. Our students belong to the more numerous middle class, who can be considered as possessing the qualities of mind enumerated above in but a very limited degree. They need to *study* and take time to revolve the thought in the mind, in order to see its bearing on the general subject and to understand its practical relations. These processes of mind are not possible with the rapid flow of ideas communicated in a lecture. Nor does the custom of note-taking, on the part of the student, very much improve his facilities for acquiring a knowledge of the lecture. There are but few rapid writers among students, and even the best of them, while jotting down one important fact or principle, is quite likely to allow several just as important principles expressed by the lecturer to pass unnoticed. It must therefore be evident from every view of the case that the amount of knowledge acquired and fixed in the memory by hearing a lecture is extremely limited. If the student makes the attempt to refresh his memory by reading reference-books, he is sometimes obliged to go over from one hundred to two hundred pages; which having read, he finds himself clearly recognizing but here and there a thought expressed in the lecture. In the pressure of work forced upon the student by the numerous appointments of the day, very few ever find time for such reading except by intrenching on the hours of sleep.

Before the age of books, lectures and oral instruction were the only means of popular and professional education. At the gates of entrance to large cities, where, on the days of the performance of various religious rites, there were gathered large assemblages of people from the adjacent country, the lecture platform was established. But not this alone. Groups of individuals were here and



there gathered by those specially adapted to give colloquial instruction. In a lecture recently delivered by Henry Clay Trumbull at Yale College, he says, "It was about 80 to 70 B.C. that Simon ben Shetach, as president of the Sanhedrim, established a system of elementary religious schools. In addition to these elementary Bible schools, there were more advanced Bible schools in connection with every local synagogue. The afternoon service of the synagogue was one of interlocutory Bible study for young and old together. The method of instruction was entirely interlocutory and catechetical. Great importance was attached to this method. A responsibility was regarded as resting upon the Jewish teacher to *teach* his scholars, not merely *talk* to them."

It was at the time of this strict adherence to the interlocutory method that Christ the Divine Teacher was born. He is spoken of as both preaching to and teaching the people. His sermons were very few. But he often taught in the temples, by the wayside, on the fishing-grounds, in the market-places, and often called small groups aside to some retired spot for instruction, when his method was that of dialogue, or questions and answers. These are most worthy examples of the sure and true method of permanently fixing instruction in the mind. This was an age without books. The manuscript rolls chained to the platform in the temple, or locked in the archives of the government, were accessible only to the teachers.

In the days of Egypt's greatness thousands of manuscript rolls of papyrus were gathered in the great Alexandrian Library, treating of all matters of science and religion; all the specialties of medicine were taught, even dentistry, by lectures and otherwise; the teachers only, by special favor, having access to the library. Hence it will appear that the lecture system was a necessity growing out of the want of books. But the lecture system did not lose greatly its popularity by the invention of the art of printing and the introduction of books. For the priests, who were the only authorized teachers, had taught, and the people had believed, that their words were inspired by the gods,—that knowledge gained otherwise than from them was but deception and lies. When the people came to them as the only true source of knowledge their pride was greatly fostered, and to keep up this inspiring flattery it was necessary that the teachers should discourage the use of books. Is it not true now that there is much of pedagogic pride to be overcome before the advent of text-books into our professional schools? Do not instructors hug to their bosoms much of solacing flattery when the class sitting before them respond *ipse dixit*?

We may learn much from religious schools, which are well known for thoroughness in imparting and fixing instruction permanently

in the mind. The Jewish, Catholic, Presbyterian, Methodist, and Congregational denominations alike trust to catechetical schools chiefly for teaching doctrine, and to sermons for illustration and enforcement of the principles taught in the schools by the aid of elementary text-books. Homiletic teaching is an education more largely of the sensibilities than of the intellect.

We may learn much also from our literary institutions where the elements of all science and learning are taught. In all grades of these schools, from the common school to the highest college, the method is that of text-books without lectures, and the recitations are catechetical. There is no other method of instruction so impressive as questions and answers.

The most effective political speech that I have listened to during the present campaign was one delivered by Hepburn, of Iowa, which was made up entirely, from beginning to ending, of questions and brief and pointed answers,—the interlocutors introduced being father and son talking over the political differences of the two great parties.

Think of teaching arithmetic and grammar by lectures, instead of by text-books of rules and principles to be memorized! The lecture is legitimate in the higher branches of mathematics,—in practical trigonometry and astronomy,—and in philology and the structure of language; for the pupils in these studies are educated up to the lecture standard. But in elementary teaching the lecture should take the lower place, not the higher.

The educators in our common and high schools make a constant study of methods of instruction. The Normal, a modern institution, is a school for the inculcation of methods of education. Yet how little do our professional schools profit by it! Why not teach dentistry, in its scientific branches, as mathematics and language are taught? We need to have more teaching and less talk,—more study of books and less rambling over the broad fields of science in the gay attire of eloquent words. Can you teach botany by taking your pupils on a stroll through a flower-garden, or by giving them a ride over the prairie in a cart? No: the student must get down out of the cart and pluck the flower, and with book in hand analyze it. He must pull the various grasses and compare them by close study of their peculiarities.

The method in our colleges and universities for more than a century has been to give instruction, almost exclusively, by text-books and recitations, requiring that rules and principles be memorized from the text, word by word. Memorizing the text is one of the most important principles of elementary education. I can speak from experience, having required this in my own teaching for the

past three years. Our students in far the larger number are qualified only for elementary methods. Why then adopt so generally methods adapted only to educated minds? Fifty years ago the larger number of those who offered themselves to the professions were graduates from literary institutions. In cases not of this class they were persons who showed unusual aptitude for study, and were self-educated. Such men are qualified by discipline and development of mind to receive instruction through the medium of lectures. What I have said thus far is designed to stir up the minds of teachers and students, and the profession generally, to the necessity of simple, brief, elementary text-books of dentistry,—not elaborate, exhaustive treatises and reference-books, but books of rules, principles, facts, and illustrations, pointedly and concisely stated, so that they can be readily memorized by the pupil.

Another, a very shining mistake, is, as I think, found in the large number of instructors employed in our colleges. The long list of clinical instructors is peculiar to dental colleges, and constitutes a sort of dental college pageantry,—a glamour of shining names and titles to attract the eye. The long list of titled men proclaimed in an announcement *sounds* well at a distance. They are as meaning as a Chinese gong at the door of an eating-house. But looking at the matter candidly, let me ask, are not these long lists of names more for the purpose of attracting attention and for securing the influence of such names in bringing students to the college than for the legitimate purposes of education? The system is held up before the eye of the student as an important feature of this or that school. In politics such a measure would be called *bombast*; and in educational matters, is it not a kind of stuffing used to swell the college measure to commanding proportions? When occasionally the opportunity is offered of securing some highly valued service from a distinguished operator it certainly cannot be objected to. When objection is made to the large number invited, the reply is made, "It is not expected that many of them will be present to operate: not more than one in ten ever appears at the school." This only shows the falseness of the pretence. Yet there are those who honestly believe that a large clinical corps of instructors is a very great advantage to the student in acquainting him with the different methods of distinguished operators; and some colleges advertise the presence of one or more such every week of the term. Query: Is it an advantage, or an evil, to give to the student in a ten months' or in an eighteen months' course a great variety of methods of operating? Is it well to even attempt to give to the student, while in his college course, *all* the ways and methods known to the profession? Will he not come out better at the end to give his atten-



tion to the ways and methods of *one* good operator than to have his student-life vexed with a variety of methods, with the probability that he will acquire no method *thoroughly*?

It is easy to decide upon the question of methods when you go outside of dental schools, and observe methods in other departments of instruction.

Learning to operate at the dental chair is not essentially different from learning to write at the desk. Both are manual and mechanical operations aided by oral instruction.

Suppose a pupil wishes to learn the art of writing. Shall he have *one* instructor, or *many*, each writing a different hand? Shall he form his letters after the pattern of *one* master's hand, or shall he have a new master every week, with some modification of the forms of letters pertaining to curves, angles, loops, slope, and relation of long to short letters? One week he writes a round hand; the next week under a new teacher he writes an angular hand; then under another teacher he writes a semi-angular hand, and so on with slight variations every week. What sort of a hand will the boy write at the end of the term? He will have a disjointed, irregular, illegible mixture of styles, void of all symmetry and grace.

There are various methods of teaching the science of numbers. Would you put a boy who knows nothing of arithmetic under the instruction of three or four teachers, each with his different methods of calculation?

If in none of these instances it is desirable to multiply methods by multiplying teachers, why is it desirable to multiply methods in teaching the science and art of dentistry?

After a student has become proficient in one method, it is time enough then, and after he has left his *Alma Mater*, to acquire the methods of other schools and other instructors. This he can do with profit, in some cases, at least, by attending the various State and district societies, which are the colleges of the profession.

There is another method of instruction which I fear very much to touch in criticism, because of its popularity, and lest I should be misunderstood. It seems quite impossible even for the best masters of rhetoric, belles-lettres, philology, and elegant literature to so construct language that it may not be misconstrued and drawn from its intended meaning. The method or custom to which I refer is that of intrusting, to so large an extent, dental education to those who have had no special education in dentistry. While it is true that medicine and dentistry are based upon the same fundamental sciences, each requires a different grouping of facts and principles to be presented to the special consideration of the students of the respective professions. One educated for the medical profession and



not the dental, the whole current of whose thoughts eddies around the medical practice, cannot make the proper grouping of facts and the proper application of principles for the dental student.

Take for example the science of chemistry. This is considered one of the medical sciences. Suppose it is taught as an abstract, independent science, apart from those groupings of facts and lines of thought which tend toward the medical practice on the one hand and toward the dental practice on the other, neither the medical student nor the dental student derives much practical benefit from the lectures. The student wants *medical* chemistry or *dental* chemistry, not abstract chemistry. The dental student also needs *dental* physiology, and *dental* pathology, and *dental* therapeutics; to teach which profitably to the student, the teacher must himself be a practical dentist. A medical graduate who had passed through one of our university schools where the professor of chemistry was second to none in the land, so far as the abstract science was concerned,—for before him all material things seemed analyzed at his touch,—told me that after taking two full courses in chemistry he did not bring away with him from the college the kind of chemical knowledge that was of value to him in practice. He got too much chemistry and no medicine.

A dental practitioner whom I met on the cars on my return last year from the International Medical Congress, and who seemed like an intelligent man, told me that after graduating from both medical and dental departments of one of our foremost universities in the East, he did not feel competent to open an office and practice. What was the matter? I asked. His reply was, "Too much medicine and too little dentistry." A student studies dentistry not merely for the love of science, caring not what the science is, but he studies it for the sake of a livelihood. As desirable and important as deep and broad foundations are, they may be made so deep and broad as to exhaust one's resources and prove an obstacle in the way of rearing the superstructure. A man who wants a house to live in cannot afford to spend a life-time in laying the foundation.

The books of fundamental science used in medical colleges are not adapted to the wants of dental students; hence the two classes cannot be educated together without a useless expenditure of time on the part of the dental student. I use the terms useless expenditure and waste of time guardedly. Do not misunderstand me. I do not use the word *waste* in any absolute sense; it is a waste of time only relatively to the aim and purpose the student has immediately in view. He must take it for granted at the outset that all he will get in the college term, of any branch in the curriculum, will be but a compendium of the science. It becomes therefore a matter of

wise discrimination as to how far and how much relating to each branch of study he will attempt to obtain during the term. The medical student is expected to give as much attention to the anatomy of the foot as to the anatomy of the face; because, looked at from the stand-point of practice, they are equally important. But the dental student, receiving his instruction in anatomy in the same class, does not look upon the anatomy of the face and of the feet as equally important from the stand-point of the dental practice. He will never be called to the foot professionally; he will always stand at the head. However desirable it may be for him to understand botany, geology, mineralogy, and other correlated sciences, he has no time for these during the college term. He has only time for that which is considered necessary in preparing him to enter at once successfully upon the practice of dentistry. What he has omitted must be taken up afterwards: to do which he must become a life-student.

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### ROOT-FILLING.

BY A. E. BALDWIN, M.D., D.D.S., CHICAGO, ILL.

(Read before the Chicago Dental Society, January 8, 1889.)

A PROPER understanding of physiology and pathology is essential to an intelligent treatment of pulpless-root cases. While the writer feels that, by himself at least, there can be very little new written on the subject, yet his desire is to call attention to a few points and their probable bearing on this theme, and he hopes that the discussion following the reading of the paper will bring out facts that he may have omitted, for with all of us this is an intensely interesting as well as a very practical subject.

By the title given the paper, the writer is freed from a discussion as to the previous condition of these roots,—*e.g.* as to whether or not they are proper subjects for pulp-capping or for the destruction of the pulps,—and at once enters upon a consideration of the proper treatment of the pulpless tooth, whether freshly or remotely made so. A rule can hardly be formulated for the treatment of this or any other pathological condition which is not subject to many exceptions, so that all must understand that when the writer speaks of a rule of procedure, it is not to be accepted as an invariable rule. There are many conditions of the patient in regard to age, temperament, health, as well as local conditions, that must be taken into account, and the successful practitioner is the one who looks over the whole field. There are some conditions wherein the writer thinks "root-filling" had better not be practiced at all.

When we consider the position of the root of the tooth, encased as

it is in an osseous receptacle with a very thin and highly sensitive membrane interposed between root and case, said membrane being very firmly attached to the external or cemental layer of the root, and realize fully that for all practical purposes the covering is a periosteal investment, we cannot but appreciate the fact that a slight irritation from any pathological condition or from the presence of a foreign body in the shape of filling-material may provoke a troublesome and sometimes serious inflammation. We must equally appreciate that whatever we do in treating these cases or conditions, we should not increase but lessen the irritation.

The subject may therefore be contemplated under two divisions: 1st, Condition of roots and surrounding tissues; 2d, Material for root-filling. To facilitate its consideration, the first division may be sub-divided into four classes: 1st, Freshly devitalized roots; 2d, Pulpless roots without noticeable irritation; 3d, A condition (termed blind abscess) where there is serious irritation usually with suppuration, but without a fistulous opening; and, 4th, Alveolar abscess, either acute or chronic.

Regarding these various conditions, it may be said that in the first two classes there can hardly be any question as to the propriety of immediate filling preceded by properly cleansing the root-canal and an equally thorough drying of it. Special emphasis is here put upon the fact that in all roots filled success or failure hinges more upon these particulars than upon any other part of the work. A paper might be written upon this portion of the subject alone. In these classes we have no irritation, and if we can succeed in these preliminaries we will have no subsequent trouble. The third varieties when seen are usually violently inflamed, accompanied by a circumscribed suppuration. In such a case the writer's custom is to open the abscess,—through the tooth if possible,—and, as the parts are so sensitive, to wait from one to three days for the inflammation to subside, then treat as in the first two classes. In the fourth class, the rule is—as in the others—to remove *all* the septic or putrid substances; and in this cleansing, or removal, the operation may often be much facilitated by the use of peroxide of hydrogen, in consequence of its great chemical affinity for and with putrid substances and pus. As soon as properly cleansed and dried, they are in the best possible condition for filling. The query what good can be accomplished by further treating the abscess comes only indirectly within the limits of this paper, but the writer desires to state that he thinks every abscess to be caused by irritation, and that upon the removal of the irritation the abscess will take care of itself much better than we can take care of it. The much-talked-of sac and fistula (both of which are only fortifications which nature has erected to guard her



tissues from injury) will subside, because in these abscesses the irritation is from the gaseous products of putrefaction, and when those are removed, the walls desiccated, and roots filled, nature will care for the rest.

In regard to division 2,—the material to be used for a filling,—anything which is non-irritant and insoluble, and will hermetically seal the apical foramen, is suitable. The writer invariably uses a creamy solution of gutta-percha in chloroform, always making an opening into the tooth so as to obtain the most direct entrance to the root-canal. When practicable, he reams out the entrance into it slightly, and then pumps the solution into the canal with a fine broach wound with a few shreds of cotton. He then wipes out and dries the pulp-chamber, places a small piece of heated gutta-percha base-plate over the entrance to the root, and by very gentle pressure on this forces the canal contents down till he is reasonably sure the solution has reached the apical foramen. He believes that often the subacute inflammation following root-filling is caused by carelessly forcing the filling beyond the apical foramen. In many cases, ere dismissing the patient, he paints the gum over the filled roots with equal parts of tincture of aconite-root and tincture of iodine, as a counter-irritant. He does not claim perfection in this plan of treatment, but cannot help expressing astonishment when brethren say that in *all cases* a treatment in one or more sittings should precede the filling.

Briefly stated, the writer's conclusions are as follows :

- 1st. That simple cleanliness is better than a powerful germicide.
- 2d. That admitting that micro-organisms are the cause of all inflammatory troubles (which I do *not* admit), a thorough desiccation or drying will render them as harmless as the filling itself.
- 3d. That in cases of subsequent trouble the tooth may with much greater satisfaction and directness be treated from the outside than through the root-canals.
- 4th. That in the aggregate more harm than good is caused by the use of the various so-called germicides and antiseptics in treating root-canals.
- 5th. That in the light of the most recent investigations it may be declared that it is far from being proven that micro-organisms are in all cases the cause of suppuration.
- 6th. That no doubt inflammation is necessary to suppuration, as illustrated in Miller's experiments, but one cannot get violent inflammation without a liability to suppuration, and until it is proven that suppuration is caused by micro-organisms it is begging the question to say that suppuration is always caused by micro-organisms. If the



inflammation subsides without suppuration, we must conclude that the micro-organisms are absent.

7th. That the objectors to immediate root-filling almost always lay stress on some particular case where probably it is not practicable, for I have never seen anyone who would hazard the statement that he would *always* fill *all* roots, either immediate or *mediate*.

Again, one may well doubt the wisdom of accepting in these matters the opinions of those in the profession who are so vacillating in their own conclusions as to at one time advise one way and at another time condemn the practice.

Finally, why do we want to treat the tooth? Does treating the tooth clean it? If so, why not clean the tooth entirely by treating? If not, is it not paying a premium for carelessness and imperfect work to advise continual treating? Will not the operator say to himself, I think it will do; we will try anyhow?—and peradventure keep trying, at the patient's expense and to the injury of the good reputation of the profession.

## REMOVABLE ARTIFICIAL DENTURES.

BY DR. H. A. PARR, NEW YORK, N. Y.

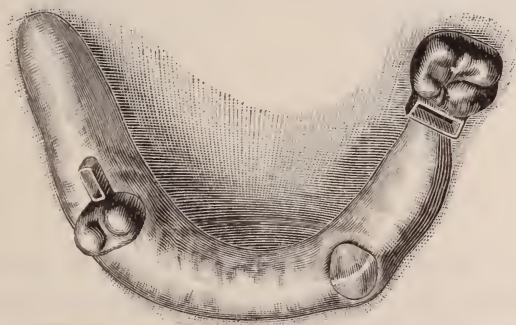
IN the construction, adjustment, and placing of a dental substitute one of the first considerations is its immovability in position, and next its removability for cleansing or repair. The old styles of clasp-dentures met these two essential requirements when the forms and relations of the supporting teeth were such that the clasps would firmly embrace those natural teeth, and hold the close-fitting plates in position. But the clasped teeth soon became worn or wasted, and in consequence the loose denture lost its efficiency. Even in favorable cases, the inverted cone shape of nearly every natural tooth made it a matter of difficulty to secure at the neck near the gum a tight fit of the springy clasp which, in every instance, must have been large enough to go over the crown of the supporting tooth. Then too there was the tendency of the plate to press into the gum and so become loose by carrying the clasp to a yet narrower place on the tooth. In many cases, moreover, the supporting teeth inclined towards or away from each other, and made it well-nigh impossible to construct a plate which could be sprung into place and yet so tightly clasp the teeth as to firmly hold the denture in position.

My object in devising the method of attachment and organization of dental substitutes now to be explained was to avoid the difficulties mentioned, as will be made evident in the following description of two practical cases.

Fig. 1 is from the plaster cast of a lower jaw in which only the

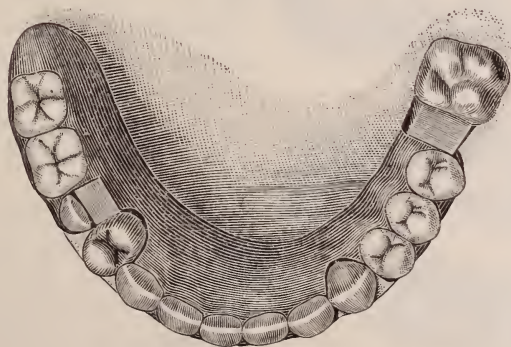
lower left second molar, cuspid, and right first bicuspid remained. The molar and bicuspid were fitted with gold cap-crowns. Gold sockets were prepared, and gold tongues, made of strips of spring gold plate having their ends folded upon themselves to form spring catches, were fitted to the sockets. The cap-crowns were placed on the plaster teeth, the boxes or sockets hard waxed to the sides of the crowns, and the tongues hard waxed to a piece of stiff wire so

FIG. 1.



that the two tongues could be lifted out of their sockets without breaking either the tongues from the wire or the sockets from the crowns. When by repeated trials this could be done, the crowns and sockets were taken from the cast, invested in plaster and marbledust, and the sockets soldered to the crowns. These were replaced upon the cast and appeared as seen in Fig. 1.

FIG. 2.



The tongues were then placed in the sockets, the artificial teeth arranged on the cast and waxed up as usual for vulcanite work, taking care that the projecting ends of the tongues were so imbedded in the wax that they would be held firmly when the piece should be removed to be flaked. It is in fact best that at the out-

set the tongues should be soldered to a stout gold wire bent to fit the cast, so that the wire will stiffen the waxed-up piece, and also hold the tongues more securely in the piece during and after vulcanization.

Fig. 2 shows the vulcanized denture in place on the cast.

FIG. 3.



The underside of the denture is shown in Fig. 3, which also makes evident the forms and relations of the tongues which hold the denture in place. The parallelism of the tongues permits their ready removal from their sockets, no matter how much awry the support-

ing teeth may be. The bearing of the denture upon the cap-crowns admits of the contact of the denture with the gum on which it rests, but cannot be pressed into because of the cap-crown supports. The original denture of which this is a duplicate is now in satisfactory use.

FIG. 4.

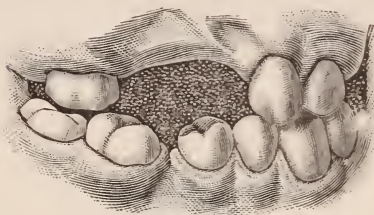


FIG. 5.

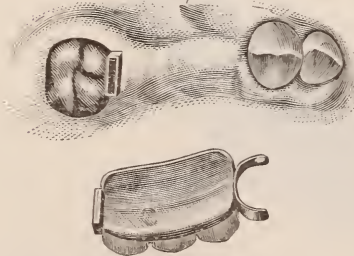


Fig. 4 represents the articulated cast of a case for which a similar tongue and clasp vulcanite denture was made. This is illustrated in Fig. 5, which needs no description. Fig. 6 shows the denture in place, the original having been made for and placed in the mouth of a patient exhibited at the clinic of the Odontolog-

ical Society of Pennsylvania, at Philadelphia, in December, 1888.

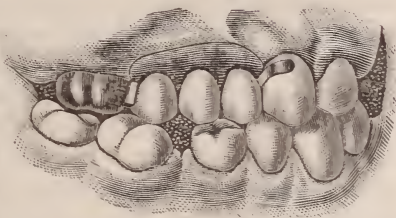
These are simple examples of a class of work having a wide range of application and capable of construction without the trouble and cost of all-gold plate-work.



The sockets and spring tongues require some skill and nicety of workmanship to insure a close fit of the one in the other so that the attachment shall be firm, yet capable of easy-designed detachment for cleansing or repair.

A notable advantage of this mode of constructing dentures for the upper jaw is manifest in the fact that the surface of the plate which rests upon the gums need only be wide enough to cover the ridge, and thus avoid the quite too common interference of artificial dentures with the functions of taste and speech.

FIG. 6.



## PROCEEDINGS OF DENTAL SOCIETIES.

### CHICAGO DENTAL SOCIETY ANNIVERSARY.

THE twenty-fifth anniversary of the Chicago Dental Society was held in the ladies' ordinary of the Grand Pacific Hotel, Chicago, February 5, 6, and 7, 1889.

There were a great many dentists from other localities in attendance, and the members of the society congratulated themselves upon the success of the meeting. The students of the various dental educational institutions helped to swell the attendance, which was between four and five hundred. The clinics were held in the rooms of the Chicago Dental College.

#### FIRST DAY—*Morning Session.*

The meeting was called to order at 10.15 A.M.

President J. A. Swasey made the opening address.

Dr. A. H. Thompson, of Topeka, Kansas, read a paper entitled,

#### GUM-COLORED PORCELAIN FILLINGS.

He prefaced his paper by saying that the subject of the art of porcelain filling is in its crude state, but that he thought there could be no question that in many cases it was to be preferred, as porcelain resembled the natural tooth in color, texture, and density more closely than any other material.

Porcelain fillings were principally used now in the way of restoring whole crowns of teeth; also in the way of inlays, and have served a good purpose; but the difficulty is in making them so that the line of repair will not be seen. This is a real difficulty, and one



which no method of inlay yet shown has overcome. One branch of the porcelain inlay system is the filling of cavities near the gum with gum-colored sections cut from artificial porcelain teeth. This can be done so as to give exceedingly good results.

Dr. Thompson said his practice was to excavate the cavity so that it would have a flat floor and square edges all around; he then cuts from an artificial gum-section a piece and grinds it down and fits it very carefully to the cavity, cementing in with cement colored with vermilion. The restoration of the gum artificially has a very good effect, especially in comparison with gold filling in similar position, as the natural appearance of the gum is restored and the line of union is not visible.

In some instances, where the cavity extends far around the curve of the tooth, it may be necessary to insert two pieces of porcelain in the same cavity, thus forming a kind of mosaic; however, this does not add materially to the difficulty of the operation.

In concluding, Dr. Thompson hoped to hear the views of any others who had made similar fillings, as he believed they were entirely new with him.

#### *Discussion.*

Dr. Thomas, of Des Moines, Iowa, said Dr. Thompson's process of making these fillings was very different from his. In making porcelain fillings, he first prepares his cavity, then takes a strip of ribbon platinum which he burnishes into the cavity so as to make a matrix; then bakes the porcelain filling into the matrix, and the filling thus made fills the cavity perfectly. He cements it in, and the operation is complete. He said that he had some such fillings made more than two years ago, which were perfect to-day. At first many thought the cement would wash out, but it does not. The fit of the filling to the cavity is so good that the fluids of the mouth cannot enter to dissolve out the cement. Dr. Thompson uses his fillings only on the visible surface of the anterior teeth, but Dr. Thomas said he used his process in any part of the arch, and in a great range of operations. He used it to build up a broken-down tooth or to restore a corner broken from an incisor.

Dr. Dorrance said that, while porcelain was available in the method described by Dr. Thomas, he thought that, on account of the superior density of the teeth as made by the manufacturers, the results would be better, especially in positions where the fillings will be subject to strain, when the fillings are made from pieces of teeth, selected carefully for each case, than when they are made and baked in a matrix. Porcelain fillings, when they are suitable, are more artistic and available than those of any other material, but they are not

universally applicable. The subject is well worth the thought and trial of every practitioner. With care one can easily arrive at results which will be exceedingly pleasing both to his patients and to himself.

Dr. Reed would ask how porcelain fillings were retained, as for instance in the restoration of contour of a central incisor.

Dr. Thomas said that after preparing the cavity he cuts a retaining-pit, or pits, as would be necessary, and, punching a hole in the platinum, he inserts the pin and bakes the porcelain around it; then cements the pin into the retaining-pits and grinds the porcelain to contour. He finds it difficult to get the exact shade, but takes care to have it darker rather than lighter.

Dr. Dorrance drew a sketch to illustrate his method, representing the restoration of one corner on an incisor. He takes a piece of a porcelain tooth and drills a hole in it down near the point,—so low down that a pin extending from it into the tooth to be repaired would not touch the pulp. He bakes this pin into the hole drilled in the porcelain with ordinary body. He takes pains to make the cavity bottom true, with a diamond disk; and cements the piece in.

Dr. L. L. Davis said he had had opportunities to see many fillings put in by Dr. Land according to the method of the gentleman who opened the discussion, and would not wish to have any such in his mouth or in his practice. He spoke particularly of one case in which the enamel had been replaced with porcelain, and the result was disgusting,—a little worse than anything he had ever seen. He does not think the process is nearly as good as using an artificial tooth as described by Dr. Dorrance.

In answer to a question as to how he retained the inlays in place, Dr. Thompson said that when he could he made a slight undercut or dovetail, but by fitting closely and getting as much depth as possible the cement would hold. There is an erroneous impression that cement is not durable. It is. He had pieces which in two years showed no effect on the cement; the crevice between the piece inserted and the tooth is so small that there is no chance for it to be affected. Cement as a filling, when it is durable, is superior as a conserving agent to any other material, as it adapts itself more closely to the sides of the cavities, even entering, perhaps, into the canaliculi and sealing them up.

Dr. Peterson, of Iowa, said his wife had a tooth badly decayed near the gum, and he did not wish his professional standing injured by the decay being allowed to be seen, nor did he wish to advertise his business by the exhibition of a prominent gold filling. He took an English tooth, as being more dense than the teeth of American manufacture and giving a better finish after being ground down,

shaped a piece to fit the cavity closely, and inserted it and made a very satisfactory filling.

Dr. Fernandez said that he thought the plan advocated by the paper was a good one, though it was new to him. He had used porcelain tips for filling teeth. The ones he used were made in England, and had central platinum pins. He prepares the cavity with a bur; then grinds down the tip to fit and cements it with oxyphosphate, and then grinds down the protruding surface to the contour of the tooth.

Dr. Harroun, of Toledo, O., said it appeared that no one had used the gum-colored porcelain fillings. It seemed to him a real step in advance, which they should all welcome and should give the credit and honor of the discovery to Dr. Thompson.

Dr. Thompson said that the process was as yet in its infancy, but the natural artistic taste of practitioners would lead them to adapt and improve it.

Dr. Green, of New Albany, asked if the cement would not dry quicker and polish better if the filling was heated before it was inserted.

Dr. Fernandez said he never heated, but always varnishes the cement with shellac; mixes it very thick, and with a small pellet of cotton flows the varnish over it; then lets it rest ten minutes and grinds.

The subject was passed.

Dr. T. E. Weeks, of Minneapolis, Minn., read a paper on

#### OBTUNDENTS OF SENSITIVE DENTINE.

After describing the teeth in their several parts and their relations to each other, Dr. Weeks said that in a normal condition all dentine contained a certain amount of water; when this is removed the normal function of transmitting impressions seems to be suspended or at least modified. Various theories are advanced to explain this. That the tubuli contain only a fluid capable of transmitting sensation and pressure, and that this may be removed, thus destroying the function, he could not believe; but that water is present, not only as a constituent of the fibril, but also surrounding it, seems to be true. Then if this fibril be a protoplasmic mass responding to irritation by motion, may not the removal of the water surrounding it relieve in a degree its natural restriction within unyielding walls, thus allowing motion in the fibril, not restricting it to the cell itself? But is this dehydration accomplished without one of two factors,—a raising of temperature by heat in the form of hot air, or lowering of temperature by evaporation? If the ground he had taken was



tenable, either combination would produce the result desired, because it has been shown that the motions of the class of cells under consideration are retarded and finally stopped by cold, and rendered more active by heat, which, when sufficiently increased, causes them to take on a state of tetanic contraction, thus stopping all motion. We know that heat or cold will produce irritation or pain; also that violent or continued irritation will induce hyperemia and inflammation. This knowledge should cause us to proceed with extreme caution when resorting to desiccation. Many chemical agents lower the temperature by evaporation; some dehydrate by means of their affinity for water, as absolute alcohol. Ether and chloroform act mainly by evaporation; others, like chloride of zinc, combine with the dehydrant action a destruction of a portion of the fibrillæ. Others again act only as anodynes. These fail wholly or in part either because they do not act upon protoplasm at all, or because they cannot penetrate the dense structure far enough to make their influence felt; and cocaïne, while it acts readily upon the nerve-endings of mucous tissue, is inert when applied to dentine, except in certain cases of loose structure. Until recently all efforts at obtunding have been confined to the dentine, but now some efforts are being made where the result seems to be anesthesia of the pulp. Dr. Custer thinks that by the Ottolengui method the pulp shares the anesthesia of the fibrillæ; however, he does not seem to have proven his hypothesis by the removal of a pulp after employing this method. The application of cocaïne and alcohol by electrolysis, after the method of Dr. McGraw, does anesthetize the pulp. The writer had removed ten pulps with very little pain, in some cases with none at all.

Attention has been called to the influence vibration may have over the fibrillæ of the pulp. It is certain that a severe shock will for a time benumb the sensory nerves; also that a succession of slight shocks, no one of which may be perceptible to the senses, will produce the same result. Dr. Brimmer holds that the pulp may be anesthetized by the rapid revolution of a coarse bur in close proximity to or in light contact with the surface to be obtunded. In the organ under consideration the writer thinks the action is upon the pulp through the dentine, as Dr. Brimmer reports the removal of a pulp painlessly. Possibly the nerves of the peridental membrane may contribute. We all know that any tissue may be cut by sharp burs or a sharp knife with much less pain than with dull instruments, and if while cutting dentine the bur gets clogged it is the same as if it were dull, and the effect is the excitement of heat and its consequence, pain. If the cavity is dry, the bur will be much less liable to clog than if moist. The bur should also be a small one, for it will



require much less pressure. When we come to consider the cutting of the dentine, we encounter that added sensitiveness produced in the patient's mind by the senses of hearing and sight. Although it is true that nerves or protoplasmic fibrils may be severed painlessly by the flash of a keen blade, still it can rarely be done in the sight of the patient, or if he is aware of the operation. No dentist who has listened to the manifestation of pain by screams during the experiment of revolving a bur in light contact with non-sensitive dentine on the outside of a tooth, can doubt that this hyper-sensitiveness is induced wholly by the mind,—but how to control it, “there’s the rub.” Control this imaginary sensitiveness, and the reduction of actual sensitiveness is easy. There is nothing for it but “mind cure.” Do not those practitioners possessed of strong personal magnetism succeed best, other things being equal? Gaining the confidence of the patient is everything. We should cultivate self-poise and confidence, and we would succeed better.

There are agents which are sometimes employed to lull pain which are dangerous unless very carefully used, and the writer prefers not to try them at all. He prefers to use only such as lull to sleep, feeling sure that the awakening will be to health and usefulness. Again, when the advocate of a new method says it causes slight pain, he is slow to embrace it, for pain is what he would avoid. He knows that without any but mechanical means he can perform the operation with but *slight* pain.

#### *Discussion.*

Dr. L. E. Custer referred to the effect of the imagination in the production of pain. In the cutting of non-sensitive dentine the patient imagines the pain, or the pain may be induced by the sight of the instruments. The sense of sight is one of the strongest influences in the production of pain, therefore as far as possible instruments should be kept out of sight.

The sense of smell is also suggestive. The odor of chloroform or ether will remind many of painful scenes where these have been used, and suggest a repetition of the pain associated with the use of the same drug in the past.

The personal magnetism of the operator is often powerful as an aid to the suffering patient. The operator can increase this influence by being sympathetic when pain must be inflicted, by showing his confidence in himself, and by his familiarity with his instruments.

Drugs act as obtundents of pain in three ways: by reduction of temperature, by change of structure, as in the coagulation of albumen, and by dehydration. Dehydration has more effect upon the dental fibril than upon most other tissues; this needs the presence of water

for its function, and is most easily produced by absolute alcohol, and the hot blast from the chip-blower. It is effective in proportion as the water is removed.

Reduction of temperature acts alike upon the dentine and the soft tissues. If the temperature is reduced the sensitiveness will be diminished, and if the reduction is continued a point will be reached where there will be complete insensibility to pain.

It is difficult to get coagulation to extend below the immediate surface, as the process is self-restrictive, the coagulated albumen on the surface protecting that which is below from the action of the drug. Carbolic acid is the best preparation for reducing pain by this change of structure.

Dr. Custer suggested the use of some agent which would combine the effects of coagulation and dehydration, and said that chloride of zinc is the only substance which answered for this purpose. A sensitive cavity filled with oxychloride of zinc and left for a day or two, the filling being then removed, could be prepared and filled permanently, as the sensitiveness will have disappeared.

Recently Dr. Ottolengui had introduced a method which acts in two ways, effecting both desiccation and reduction of temperature. The anesthesia is complete, but it is necessary to operate quickly, as the sensitiveness returns with restoration of the natural warmth of the parts. Of course it is not intended for the sake of obtunding pain to carry the reduction of temperature to the point where the tissues will be frozen, but only so far as is necessary to suspend the neural activity.

When for any reason we are not able to obtain freedom from pain by any of these means, we must use sharp instruments. The action of a dull tool will cause much more pain than the keen cut of a sharp one. Another precaution we can take is to cut as much as possible *from* the pulp, instead of *towards* it, thus separating the part cut from the sensitive nerve. While using the engine it is well to keep down the temperature by flowing a small stream of water over the bur or wheel which we are using.

Dr. Thompson said his custom was to treat sensitive cavities by filling them with oxyphosphate for a week or two. He found this to be effective and a great saving of time. It is reliable and satisfactory, and he saves more pulps than he should if he were to resort to any of the instantaneous processes which have been suggested.

Dr. Harlan said that the thing that excited his admiration in Dr. Weeks's paper was that it was not encumbered with therapeutic methods of obtunding, but dealt in principles. We are about to arrive at a stage when empiricism will have to take a back seat. He said that perhaps he was responsible for much of the therapeutic

nonsense about obtunding sensitive dentine. He thought he had discovered a panacea, but he finds now that many of the agents proposed are only useful in certain cases, and no one or two will prove universally successful. He does know that if one can inspire confidence in his patient to rely upon his intent to do the least possible hurt to his feelings, he is on the road to help him with less hurt than if he feared or distrusted the operator.

To come down to specific methods, he distrusts the utility of the use of oxychloride or oxyphosphate of zinc applied to sensitive dentine with the intention of continuing the excavation within a few days. His experience has taught him that at the expiration of the time the condition will be worse. He explains this by the theory that there may be an excess of phosphoric acid, which will render the sensitiveness greater when the cavity is opened up to the air. In the course of one or two months, however, this will become dissipated and the excavation may be completed. The method by desiccation, if not carried too far, is useful, but if powerful coagulators are used they hinder the degree of desiccation desired.

The use of essential oils, of which perhaps peppermint is the best, answers a good purpose. The method of obtunding with cocaine and alcohol he was not familiar with, nor had he practiced the Ottolengui system.

Dr. A. E. Baldwin said his only method was to diminish pain by the use of sharp instruments, rapid motion, and light touch.

Dr. J. Taft was pleased with the remarks of Dr. Custer. It is important to understand principles. All cases of sensitive dentine are not alike. Every case has its individuality, owing to different conditions of the patients. One not in his usual vigor or strength—not well nourished—will be found much more subject to pain than the same patient would be under better conditions. Sometimes it is only a local hyper-sensitiveness. Such cases are not in condition to be operated upon, and the best thing to be done is to postpone the operation till another day.

There are varying degrees of sensitiveness of the dentine. It is many times simply superficial, and when a single layer has been removed the remainder of the cavity can be prepared without trouble. In other cases the sensitiveness pervades the whole of the dentine of the tooth. This can be determined by examining the tooth at another point. These varieties of condition must be noted, and will indicate the best method of proceeding.

It is a practical measure to fill temporarily and wait till the tooth gets over its sensitiveness. He prefers gutta-percha or Hill's stopping rather than oxyphosphate for a temporary filling, as they are poorer conductors of heat. There is no one course that can be



followed in all cases. We must educate ourselves to observe closely the indications, and then do what our best judgment determines.

Another method sometimes practiced is to line the cavity with a non-conductor. This of course will not do for the purpose of excavating, but after the excavation is done sometimes trouble will follow from the injury to the dentine incident to putting the filling in, and it is well to have a lining between the sensitive dentine and the metal filling. He has relied much upon desiccation; had one patient whose teeth were very sensitive, but by thoroughly drying out the cavity, by the use of absolute alcohol applied two or three times, and saturating the cavity with carbolic acid, the sensitiveness was overcome.

Subject passed.

Dr. C. P. Pruyn read a paper entitled

A STUDY OF THE EFFECTS OF COCAÏNE UPON MAN AND SOME OF THE  
LOWER ANIMALS.

Dr. Pruyn said that next to averting death the highest prerogative of the medical man of to-day is the annihilation of pain, and in so far as he is able to meet this want of suffering humanity without dangerously interfering with life's nutritive forces will he merit success in the practice of his profession. A safe local anesthetic has been a great desideratum of the profession, and we are making progress in that direction.

Cocaine has been used to some extent in the form of elixirs and wines medicinally, but the unpleasant effects which follow such use are detrimental. Cases showing the toxic effects of cocaine have been published. No one should use it who has not witnessed its effects when administered to the lower animals, in which the symptoms can be studied and antidotes tried. Dr. J. Leonard Corning, of New York, uses cocaine in general surgery, employing it for amputations, etc. His method is to first exsanguine the blood from the part operated on by the use of the Esmarch bandage up to the seat of the operation. Then with a fold on the opposite side of the extremity operated upon he passes beyond the part to be treated and makes one or two wraps of the bandage, when a one or two per cent. solution of cocaine is superficially injected. Then with a long needle he penetrates the deeper tissues to the bone, and injects five, ten, or fifteen minims of this weak solution, when he is enabled to operate painlessly upon both the hard and soft tissues. As soon as this last injection is made a tourniquet is applied to the body portion of the extremity, which prevents the drug being carried into the general circulation. In this manner the anesthesia of the part may



be made complete for several hours. After the operation is completed the tourniquet is gradually loosened in order that the drug may be slowly carried into the general circulation, and in this way so diluted and dissipated that the systemic effects are almost if not quite nil. Thus he has all the effects of the drug held in that portion of the body that he wants to operate upon. If we could make use of such a device we could probably use cocaine much more safely than we now can. It is a fact that while large quantities may be safely used on parts of the system remote from the nerve-centers, a small amount injected into the vascular tissues may and often does produce very grave symptoms. Dental operations are all near nerve-centers that control circulation and respiration, and the drug carried by the circulation has only a short distance to travel before it acts upon the peripheral nerves that convey sensation to these centers, and a disturbance of nervous equilibrium is manifest. Cerebral anemia even to the point of syncope is sometimes seen from even a very small dose and within three or four minutes after the drug has been injected.

In using cocaine for operations upon the bone, the extraction of teeth, or the removal of portions of the jaw beneath the periosteum, it should be injected into the periosteum, and not into the gum-tissue. If it is injected into the gum-tissue it acts only on that part, and if the tissue is loose and flabby the effects of the drug are so dissipated that the anesthesia is only partial.

To give a hypodermic injection for dental operations the hypodermic point should be ground down about one-half, so that it is comparatively blunt. The syringe should have a minim gauge, a glass barrel, and finger-guards, and should be kept absolutely clean,—never used for any other purpose, and before using should be made thoroughly aseptic by the use of bichloride or other reliable antiseptic. Great care should be taken to inject no air into the tissues. This can be avoided by drawing the solution into the syringe, then turning the point upwards and expelling the liquid. The glass barrel will readily reveal to the eye any air that may be present. To avoid running the point against the edge of the alveolus and also to avoid the thick, tough margin of the gum, let the point enter one-eighth of an inch from the margin, and following the surface of the bone carry it in at least three-eighths of an inch. If the beveled side of the point is held against the bone it will avoid sticking into it. Press on the piston gently and slightly, so as to expel the solution a drop at a time. The only pain that will be felt is just as you pass through the mucous membrane, and even this will be prevented by painting the part with the solution before the injection is made. After the injection is made, hold the point in posi-

tion about a minute, so the liquid may be taken up by the tissues and not spurt out when the point is removed. Unless this precaution is observed the solution is liable to pass into the fluids of the mouth and be swallowed, which is apt to produce severe nausea and emesis. Pursue the same method on both labial and lingual sides of the tooth. Three drops of a four per cent. solution on either side as just described, well into the periosteum, will so thoroughly anesthetize the soft and hard tissues that tooth-extraction or the complete removal of the bone may be effected painlessly in almost all cases. The pain is very slight, and if the syringe is aseptic no abscess will follow, and the wound made by the point will usually heal by first intention. To aid in taking impressions where there is great irritability of the palate, painting the mucous membrane of the part with a four per cent. solution will be found efficacious.

The physiological effect of cocaine in small doses is to produce hyperesthesia, dilation of the pupil, loquacity, joyful intoxication, with a peculiar feeling of restfulness.

The line of demarkation between the physiological and toxicological effects is so faintly drawn that it is impossible to tell where one begins and the other ends. In some cases the poisonous effects will be shown at once, even from a very minute dose, while in other cases the various physiological stages are well marked and the poisonous symptoms not exhibited until a very large amount of the drug has been given. The usual poisonous symptoms are: Increase of circulation, with an increase in the number of respirations and decrease in the depth of the same, sometimes quite marked. Another early symptom may be syncope, or that peculiar disagreeable feeling which precedes it. This very unpleasant feeling may come on almost instantly. Your needle may be hardly removed before the patient shows signs of syncope, palpitation, dyspnea, precordial pains, and a sensation of stifling or inability to obtain air. Dryness of the mouth and fauces, thirst, tingling of the extremities, muscular weakness, cold sweats, peculiar muscular movements almost amounting to convulsions, with a peculiar pendulous motion of the head and muscular incoördination. Its chief action seems to be upon the nerve-centers. Acute poisoning by cocaine causes muscular spasms and in consequence a marked elevation of the temperature. Death appears to result from asphyxia, caused by respiratory paralysis, the heart continuing to beat after respiration ceases.

In the writer's practice, while he had sometimes been a little annoyed by the slight poisonous effects manifest, he had never given enough of the drug to cause him to feel alarmed; but if he had not experimented upon some of the lower animals, the symptoms he had seen in the human subject would have alarmed him.

A careful watch should be kept over the patient, and any signs of heart-failure or dyspnea should be treated at once. If you see symptoms of syncope invert your patient, put his feet higher than his head, slap the face with cold wet towels vigorously, apply to the nostrils strong spirits of ammonia or nitrite of amyl, or use other approved means. Do not lose sight of the benefit to be derived from artificial respiration, for if this drug kills by paralysis of the respiratory centers the act of sustaining respiration mechanically may be the means of sustaining the life of the patient.

Morphia is an antidote for cocaine, but as the action of the former is so slow, it would seem theoretically to be good practice to first give the morphia, and when its effects begin to be apparent to administer the cocaine, and not wait to give the morphia till after the poisonous effects of the cocaine are shown.

The doctor then gave a detailed statement of a series of experiments upon dogs.

#### *Discussion.*

Dr. Kessler asked in what part of the dogs the injections had been made.

Dr. Pruyn said in the back or hips. He added that the fact that the autopsy of the dogs showed a congested condition of the kidneys indicated the necessity for caution in cases of disease of the kidneys.

Dr. J. B. Morrison said that his use of cocaine had been confined to applications to the outside of the gums. He had used it to allay the pain caused by the application of the rubber-dam. He paints the gums with a saturated solution, with the effect of quieting the pain. He uses the same solution in the same way when lancing the gums. He has never had any bad effect from its use in this manner. In one or two cases he had employed cocaine hypodermically, and having had unpleasant symptoms result he preferred to use ether or nitrous oxide.

Dr. Martindale said he had observed that after administering cocaine to a patient, feeling the pulse or seeming to anticipate toxic effects brought about the very evils that were dreaded. He thought any solution of cocaine would be valueless unless it was fresh.

Dr. Freeman said he had had a case a few days ago in which a physician had injected about a grain of the drug into the tissues about the root of a tooth which he was preparing to receive a band for a bridge-piece. The patient soon began to exhibit very alarming symptoms,—labored breathing, irregular heart-action, and nausea. These symptoms soon passed away. This was the only case which has given him any trouble.

Dr. Atkinson said that in the East they had had very little faith



in cocaine, because of the many failures in practice. The administration of this drug is in the hands of experimenters, and he did not think it safe to use it in his practice until it was better understood.

Dr. Conrad said that he thought the use of cocaine had been much abused, that not enough care was used in the selection of cases. He had used it about a hundred times, and had never had any bad results, though there had been symptoms which had alarmed him. He had never used less than one-fourth to one-half of a grain hypodermically, and the more he uses it the more careful he is with it. He thought that cocaine was needed in certain cases in which it is impossible to operate without an anesthetic, and in which chloroform was inadmissible and nitrous oxide too brief in its effects. As a result of his experience he held cocaine in high esteem and would not do without it.

Dr. Pruyn, in closing the discussion, said that the decomposition of cocaine solutions can be prevented by the addition of some antiseptic like carbolic or salicylic acid. He would not use cocaine in any case of heart-, lung-, or kidney-disease, nor in pregnancy, nor if the patient was in an exhausted condition. As Dr. Atkinson says, it is an uncertain drug, and it is advisable to be careful in its use and have every known antidote by your hand in case of any untoward symptoms. Be ready to do all that can be done, and your confidence will lessen the probability of danger. Used intelligently and carefully, cocaine is a valuable remedy, but it should not be abused. In most cases children bear it in proportionate doses better than grown people.

Adjourned to 7.30 P.M.

### *Evening Session.*

Dr. J. J. R. Patrick, Belleville, Ill., read a paper upon

#### THE STUDY OF PRE-HISTORIC REMAINS IN THEIR RELATION TO DENTISTRY.

He prefaced his paper with a brief *résumé* of the early history of Chicago and vicinity, and a description of some of the advances of civilization and knowledge which have been made since that time. He claimed that the advance of civilization was largely due to the organization and division of labor into specialties. By the division of labor the different branches were elevated.

The professions of dentistry and surgery have a history as old as that of medicine, but they remained in a passive condition until the investigations of Hunter gave a new impetus to scientific work in this direction. Our rapid advance during the last forty years must



be attributed to the influence of societies, in which new ideas, inventions, and theories can be checked and compared, and by discussion the crudities and mistakes of single minds corrected.

There are questions that come before our societies which should be carefully investigated. Such is the question of the difference between the teeth of savage and of civilized man. Are there diseases peculiar to civilized man, which cause decay of the teeth? This question cannot be answered until we can tell whether the dentures of uncivilized men were free from caries. This has not as yet been authoritatively determined. It is generally assumed that the savages were exempt from diseases of the teeth and many other forms of disease which are brought upon us by our artificial mode of life; that, while our mental capacity is increased, it is at the expense of our physical organization. To bolster up this theory any number of statistics are quoted, but these statistics are all the work of civilized people. The savage has no statistics, and conclusions drawn from this one-sided information are inconclusive. If upon investigation the savage shall be found not to have been the physically perfect man he has been thought to be, the whole theory which has been founded upon this misconception will of course be swept away. It is fortunate that the organs we wish to compare are the hardest and least destructible of the human tissues, and there are plenty of remains of pre-historic men by means of which we can prove whether the generally received theories are true.

#### *Discussion.*

Dr. McKellops said that some years ago he had offered a resolution in the American Dental Association at Cincinnati to have the skulls in the museums at Washington and Philadelphia examined to settle this question, but he did not think any such work had been done. It is a large field, and all that is needed is to have the investigation made by competent men. There is an abundance of material, and he hoped some one fitted for the task would make a thorough study of the facts and make a complete tabulated report.

Dr. Atkinson thought that the study of the teeth of the present age would be of more real practical value than could be got from delving into the graves of the past. The advances now being made in embryology and histology were of more importance, though he conceded that knowledge of the past was also desirable.

Dr. E. T. Darby thought that the paper, the object of which was to encourage careful observation, was to be commended. We know something of the character of the teeth of the ancients, but not half what we ought to know. Some years ago he had examined a large number of mummies in Egypt, and saw that their teeth were

better than those of the average man or woman now living. As near as he could judge, the mummies were of persons generally not less than thirty years old when they died, and yet only in one single case did he find any teeth missing, and in not more than two cases were there any traces of caries. These mummies lived more than three thousand years ago. It is certain that their teeth were far better than would be found in the mouths of those living here and now. He also had opportunities of examining the teeth of the ancient monks in the charnel-house of the monastery on Mt. Sinai. In this charnel-house the bones of every monk belonging to this monastery who has died during the last fifteen hundred years are to be found, and those who died at each period are buried together, so that it is known about what age any group belongs to. Upon examining the teeth, he found the most ancient were almost invariably free from defects, while the more recent were not. The result of his investigations was that he felt certain that the teeth of the ancients were better than those of the civilized man of the present day. He also found that the teeth of the present Egyptian people and the Arabs of the desert were generally good. They very rarely suffer from caries, though the teeth were usually very much abraded. They give their teeth no manner of care, but their simple diet, of barley bread principally, with no meat of any kind except very rarely, was favorable to their preservation. In Syria he found the teeth not so good.

Dr. Thompson said that it was the fashion twenty, or even ten, years ago to blame all diseases which civilized men suffered from upon civilization. Now this receives very little credence from doctors or dentists. We know now that there are comparatively few sick savages, because when a savage gets sick he usually dies; and there is very little toothache among the uncivilized, because when the teeth decay they are lost, while among the civilized the carious teeth are saved. The fact is, we are naturally neither stronger nor weaker than the savages, though by reason of our increased knowledge and better care we are able to endure more than they can.

Dr. W. X. Sudduth spoke in favor of steps being taken to bring about a thorough and careful examination of ancient skulls, and the comparison with the teeth of the present race. He thought it a shame that the dental profession should be satisfied with a superficial view of the question. There was plenty of evidence contained in the pre-historic mounds of Illinois, and having this material at hand the dentists of this State should do the work, which if properly done would be of vast interest to all, and a credit to our profession. A committee was appointed by the Illinois Dental Society for this purpose some years ago, but had accomplished nothing. We need to-

encourage men who are qualified for the study of specialties to pursue their work. They should not only be encouraged, but supported in such a way as to bring American dentistry before the world not only as an art but as a science.

Dr. Patrick said that one could never tell just what direction the discussion of a paper would take. It was like a stream of water flowing over a field, which made channels, and no one could know the shape or direction in which the channels would extend. His desire had been to impress upon those present the necessity for scientific methods of investigation. A witness in a trial in court will swear that according to the best of his knowledge and belief such and such things are true, and the case will be decided upon such evidence. A man is hung upon such evidence. This is legal evidence; but scientific evidence must be better than this,—it must rest upon research and demonstration so careful and thorough that there can be no question afterward. His paper was to suggest the necessity for a careful investigation of the subject, which cannot be settled till such investigation has been made.

Subject passed.

(To be continued.)

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### FIRST DISTRICT DENTAL SOCIETY, STATE OF NEW YORK.

THE First District Dental Society of the State of New York held a regular monthly meeting, Tuesday evening, January 8, 1889, in the parlors of the New York Academy of Medicine, No. 12 West Thirty-first street.

The president, Dr. W. W. Walker, in the chair.

Dr. Meyer L. Rhein, chairman of the Clinic Committee, read the following

#### CLINIC REPORT.

A stated clinic of this society was held this afternoon at the depot of The S. S. White Dental Manufacturing Co., Broadway and Ninth street. Dr. G. L. Curtis, of Syracuse, N. Y., operated on the superior right second bicuspid in the mouth of Dr. R. Ottolengui. The root of the tooth had been filled with gutta-percha and a Rynear crown cemented on it several years ago. An alveolar abscess had formed (indicated by a fistulous opening a little above the neck of the tooth on the labial side). Dr. Curtis removed the crown and root-filling and found the upper third of the root with a putrescent pulp, which he thoroughly removed with a Gates-Glidden drill, and cleansed the canal thoroughly with injections of hydrogen peroxide. The apex was found to have an opening through which



a bristle could be passed. Having thoroughly dried the canal by means of paper points and hot air, Dr. Curtis filled it with chlorapercha covered by oxyphosphate of zinc. Probing through the fistula indicated abscessed tissue surrounding the apex of the root, and considerable absorption of the alveolar process. It was deemed advisable to bur away all the diseased tissue, which was done by Dr. Curtis with rose-head burs. The hemorrhage was easily controlled by acid nitrate of mercury, which would also destroy any remaining portions of the sac. Dr. Curtis also exhibited a new jaw-depressor, a very powerful instrument capable of separating the maxilla in any case of tetanus due to any cause. He also exhibited the model of a case of irregularity. . . Dr. J. F. P. Hodson, of New York City, filled the posterior approximal surface of a second superior left bicuspid by means of hand pressure, using Williams's burnish cylinders. He also demonstrated the use of his combination gold-holder and mirror. . . Dr. Horace Dean, of Jersey City, exhibited his electric apparatus for heating sulphur, and various other devices for use in dental surgery. . . Dr. E. T. Starr, of The S. S. White Co., exhibited a new diamond disk. He also demonstrated the manner of using the Bonwill mallet on a Shaw dental engine. . . Dr. H. A. Parr, of New York City, distributed samples of hard fluxed wax, for use in crown-work the same as ordinary wax, only when it has been melted out the case is always ready for soldering. . . Dr. C. C. Carroll, of New York City, exhibited specimens of his aluminum cast base. . . Mr. E. E. Clark, of New York City, showed improvements in Ward's electro-metallic dental plates. . . Dr. C. H. Land, of Detroit, Mich., demonstrated his method of fusing porcelain by means of his smallest size gas-furnace. He attached two-thirds of the end of a superior central incisor for a lad about twelve years of age without destroying the pulp, the adjoining central having been repaired prior to the clinic. He also inserted a porcelain filling for a lady on the labial surface of the right inferior bicuspid.

Dr. Land. I desire to show some of the results of five years' practice in restoring teeth with porcelain. The real success of this work was not reached until the difficulties of fusing porcelain with gas were overcome. With the gas-furnace we can produce the desired result in a few minutes, and save ourselves labor and our patients pain, and are able to do operations that it would be impossible to perform in any other way with any degree of satisfaction. In cases in which it is usual to cut off the entire crown, we can save from one- to two-thirds of the tooth-substance, and avoid having the neck of the shell impinge upon the soft tissues, as when



a crown is inserted in the usual methods. In placing these shells I only carry them down as far as the tooth spreads and not past the neck, which prevents a wet joint, and is a great advantage gained. If we can save one-third of the tooth above the gum, and not have to cut it off for ten years, it is a great advantage; and then when it does fail we can resort to another method of crowning. Even in pulpless teeth we have considerable advantage.

The next step was to try porcelain fillings, which I did at first rather cautiously. I found that by burnishing thin platinum into the cavity and getting a very close contact, the cement would not wash out; that there would be hardly any change observable; and after two and one-half years I have yet to find among the incisors so restored a single failure, where the work had been properly done, the cavity prepared in a proper manner, with perpendicular sides, and not saucer-shaped. If we are careful in fusing our enamels or bodies, we can almost invariably match the exact color of the teeth. I believe the reason why cements will not be washed out of a joint of close adaptation is because of the law of adhesion; that in those narrow places if a fluid substance does get in, the law of adhesion keeps it there and does not permit the changes that may occur in wider spaces. That is the reason why a joint of close adaptation does not give out as rapidly as one which shows a wide surface of cement.

I have found porcelain fillings exceedingly valuable in children's teeth. It does not take the entire day to do the work, and when it is done the teeth look natural. Suppose you have a badly decayed sixth-year molar: you can bake one of those sections and put it on in five minutes, and do it easier than by any filling that will produce as good a result; and at the same time save the child a great deal of pain and yourself a great deal of labor.

If you are afraid of cement, use a gutta-percha solution, making straight angles, and it will stay there for years.

#### INCIDENTS OF OFFICE PRACTICE.

Dr. Horace Dean. Mr. President, I rise to ask a question. In my practice there is a central incisor which has got very "black in the face." The discoloration was caused by a filling containing some iron being placed in the root. The tooth is in a way to be bleached; but immediately above the tooth the gum has become somewhat darkened, has something of the appearance of having been scalded, or as though the lady had been in the habit of using charcoal, which she says she never uses. She has become frightened about it, and thinks there is some disease of the gums that may destroy them. I do not believe the discoloration of the tooth has

anything to do with the darkening of the gum, or that any harm will result in the future; I simply ask this question as to the cause of it in order that I may reassure her and make her feel more comfortable about it. An expression of opinion from you, gentlemen, would help me to set her mind at rest.

The tooth has been treated for a fistula of some fifteen years' standing which was cured by the use of sulphur and electricity, without any other medicament whatever. It has since given no trouble, although the tooth has been filled since last April. The color of the tooth has been restored by the use of sulphuric acid, generated by electricity; it has been bleached up to a certain point, and then it goes back again. While the sulphur is there in contact with it, it is a fair-looking tooth. I have taken out all the dentine; there is nothing left but the enamel plate. What I wanted was to get at the cause of this little trouble of the gum. There was a filling of copper amalgam put in that tooth-root which contained a little iron, and it is the iron, I presume, that has been doing the mischief all this time, because copper amalgam in other localities produces a somewhat similar effect, but not to amount to anything. It has an antiseptic effect.

Dr. E. C. Kirk. It is not clear to my mind that the discoloration is due to the presence of iron. The discoloration of tooth-substance following the use of copper amalgam as a filling-material has been long observed, but exactly what it is due to we do not know. It is supposed to be due to the deposition of some copper salts, which are ultimately converted into sulphide of copper. This is an interesting case, as showing the effect of sulphurous acid upon the copper salts which caused the discoloration in the tooth-structure, probably converting it into a sulphite, which is an unstable compound in that by union with additional oxygen it becomes a sulphate, or by loss of its oxygen it returns to the condition of sulphide, which has strong coloring properties. I should say that the return of the condition of discoloration was probably due to decomposition or reduction of the copper sulphite formed by the action of the sulphurous acid which was used in bleaching.

I can only advance a theory. Copper amalgam presents a most interesting chemical problem. There are three possible combinations of copper and mercury which are in atomic proportion. We all know that in combinations in which the equivalents of the elements united are thoroughly satisfied, the tendency to change and alteration is very slight. Many of the copper amalgams put upon the market are chemical compounds,—a definite alloy of copper and mercury mixed in atomic proportions, but with an excess of mercury; that is to say, there is more mercury than is needed to exactly

satisfy the chemical affinity of the copper; therefore if you use a copper alloy which contains an excess of mercury you are more likely to have that particular alloy attacked by the fluids of the mouth, and compounds of an organic nature, forming sulphides, or some compound, probably organic, which we do not know the exact nature of, that produces discoloration of the tooth. But if you use a copper alloy which is as nearly as possible a true chemical compound, in which the affinities of its elements are satisfied, you will not be likely to have discoloration of the tooth-structure. I have made some very careful experiments with the balance to produce a copper alloy in which the affinities of the copper and the mercury would be exactly satisfied; and I have found that the most valuable alloy is one containing a little less than twenty-five per cent. of copper, and the remainder mercury. That seems to be the proportion which results in a chemical compound; and such an alloy does not produce discoloration of the tooth-structure. I have used it in mouths in which I had a decided acid reaction of the saliva, in which there was erosion of the teeth, and I have used it in alkaline mouths, in teeth of frail structure, and in teeth of dense structure, and in no instance have I found it discolored the tooth-structure. Where an alloy is used that has an excess of mercury, it is that excess which produces discoloration, or a condition which results in discoloration. Where you use an alloy with a less proportion of mercury than that, the copper at once becomes visible, the filling takes on a copper color which you can at once detect, from the copper either as metal or suboxide appearing on the surface of it. In answer to a query, I would say that I do not know that there is any particular difference in their wearing qualities. There is an excess of the copper, which becomes rapidly oxidized, that appears on the surface of the filling. It is this oxide which soils the hands in manipulating the amalgam, and which in this particular alloy at least should in my judgment be carefully dissolved out.

Dr. A. G. Bennett, of Philadelphia, read a paper entitled

#### OUR LITERATURE, OR THE DENTIST AS A THINKER.

He claimed that a dental education is the result of three forces, or factors,—the college, the society, and the journal as a basis, to which experience must add the superstructure. As to the colleges, their greatest deficiency is in inadequate standards of admission and graduation. The society is an organized effort for mutual improvement, interchange of experience, and the preparation of papers as a basis for discussion.

It must be conceded that the modern periodical is, next to the school, the chief factor and central feature of progress in all de-



partments,—the most accessible, the most economical, and the most universal means for professional advancement. The dental journal contains not only the best and latest thoughts of the profession, in the expounding of principles, the discussion of methods, and the recording of experience, but it deals also with the speculative and theoretical. But although theories are merely temporary principles, and conclusions therefrom only temporary resting-places, even the practical man must admit their value, and subject them to the test of criticism and experience.

No matter how thorough college education may become, dental literature as found in the journals is the chief factor of post-graduate education. It is the literature of the journals which is gradually crystallized into text-books. It will not be disputed that the chief factor in all progress is interchange of thought. Dr. Faught, in a paper devoted chiefly to the statistics of dental literature, as represented in one journal,—the *DENTAL COSMOS*,—calls attention to the fact that the majority of its writers are or have been connected with dental colleges.

Next to the investigators who write for the more advanced, we need men who have the faculty of making concise and systematic summaries of annual progress in every department. By such condensation ideas, theories, methods, and devices which originally occupied much space in journals and text-books are compressed into paragraphs. Methods occupy so much space in journalistic literature that good descriptive writers are always in demand. If it be asked, What should be the style in scientific writing? Clearness and precision may be the answer. But it is not only careful writing that is needed; studious reading is equally important. Nor will reading alone produce the best results. To this must be added thinking, talking, and writing of that which has been read.

Criticism is necessary and beneficial, but criticism should not degenerate into fault-finding, or partisanship into personality. Is it true as to science, and practical as to art? are the questions to be determined, and all thinking, talking, and writing should tend towards a satisfactory answer to these queries. A new theory, a new method, a new appliance is not to be driven from the field by intolerance. Many a reputation for sagacity has been risked and lost by a hasty judgment. Let us test them, is a good way in which to receive new ideas. The progressive and conservative are alike necessary, but each may have much to learn of the other.

#### *Discussion.*

Dr. Dwinelle. The subject of the paper commends itself to us all. Most of us present are familiar with the rise, progress, and



advancement of our profession up to the present time. The rise and progress in this country perhaps represents it throughout the world as much as any profession is represented by a section. We can only confirm and indorse what we have had the pleasure of listening to from the essayist.

Dr. Kirk. Mr. President, there is a thought that came to me in listening to the paper of Dr. Bennett, which has often occurred to me, but which I have never before had an opportunity of presenting to any body of the profession,—a thought which seems to me of great importance; and it is, that it would be well for us to consider on just what lines our greatest progress has been made, and to what factors we are to look for our greatest advancement in the future; that is to say, what character of work and what sort of investigation. The earliest stages of dentistry were characterized by the same peculiarities which seem to have entered into all the sciences in their formative stage: they were almost entirely speculative. The science of chemistry was preceded by alchemy, and those who have paid any attention to the subject will see that some of the most ridiculous and absurd notions were recorded with the reverence that we now give only to the best-known scientific facts; they were received and considered in those days as vital principles in alchemy, which afterwards became by rapid advancement and elimination of error the science of chemistry. In like manner the early stages of the science of cure were characterized by more or less superstition and speculation in all branches of it. We have gotten beyond that. There are two lines on which we proceed: one is purely speculative, which has at the foundation purely and simply the question of faith, a faith which has no demonstrable fact as a basis, at least in the sense in which we demonstrate a scientific truth. Later on, after this superstitious age had somewhat passed away, came one that was characterized by investigation and experiment, when the facts and phenomena of nature were observed with less and less superstition in the surrounding atmosphere, and men came to understand more nearly and more truthfully what was taught by the phenomena which they observed. It seems to me that if there is one thing that dental science needs, individually and collectively,—individually because only by the combination of individual efforts is the growth of the profession as a whole possible,—it is the power to calmly and without bias judge of the facts or propositions presented to us in all their innumerable surroundings, and learn deductively the lessons they teach, regardless of our preconceived notions about them. By taking these observations and studying their relations to each other, we are able to form, not hypotheses merely, but speculations which we dignify by the name of theories; and every theory is valuable

just in proportion as it rests upon a foundation of known facts. If we speculate, or form an hypothesis or theory which has no demonstrated fact as a basis, it is utterly worthless.

As to the practical illustration of this thought: for several years I have watched the character of discussions and the sort of papers that are brought before dental societies on the subject of the treatment and filling of pulpless canals of teeth. We have just passed through an experience in our Odontological Society in Philadelphia, last Saturday night, which is a fair type of all the rest. The essayist made a masterly defence of the practice of filling the canals of pulpless teeth with cotton. In the discussion that followed, every known substance that I ever heard of as being used in filling pulp-canals had its enthusiastic champion, and to cap it all one gentleman said, "You may be surprised to hear it, but for twenty years, with the exception of incisor teeth, I have never filled the canals with anything." Every one of those men claim from ninety to ninety-five per cent. of successful cases. I do not think I have exaggerated. Now, there is certainly food for thought in such a state of affairs. We know these men are conscientious and truthful. They believe they get the results they claim; but I question whether they accurately observe the facts before them. It seems to me utterly impossible that so many diverse methods, entirely opposed to each other in principle, should in all conditions be successful to the remarkable degree of ninety to ninety-five per cent. of the cases; it would seem to be a very improbable, not to say impossible, result. Therefore, in view of the condition of affairs which I have just related, the thought which comes to me as I read the dental journals and listen to discussions in society meetings, is that the one point in which the dental profession lacks cultivation is the ability to view facts and phenomena dispassionately, from all sides, and learn the lesson which they teach; and not to push investigation with the idea of finding the something they want to find, but with the idea of learning what the facts teach. With that thought in view I think it is worth while to take to ourselves the injunction on the cover of one of our leading dental journals,—“Observe, compare, reflect, record;” but be doubly careful of your observation first.

Dr. Atkinson. I think the presentment we have had to-night ought to make each one of us more careful in preparation and stimulate us to acquire a greater range of knowledge and to learn well our lesson, whether we accept the idea of immediate inspiration or hold only to the value of experience, throwing away tradition and bringing things down to what has been called scientific certitude.

Let us have the noble emulation to see who will do the best work, and let us agree to accept the interpretation of the lowest and

humblest for what it is worth, as well as the most bloviating scientific statement that ever, by its presentment, drove men apart. It is the love element that inspires to effort, and is the basis of every man's activities, and the bond of union in all church and state and society arrangements of every kind. Our progress has been made by the power of earnest men who felt they had a mission to do something, and did it.

Adjourned.

B. C. NASH, D.D.S., *Secretary*.

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## UNION CONVENTION OF THE FIFTH, SIXTH, SEVENTH, AND EIGHTH DISTRICT DENTAL SOCIETIES OF THE STATE OF NEW YORK.

(Continued from page 153.)

### SECOND DAY—*Afternoon Session* (Continued).

DR. W. C. BARRETT, prefatory to reading a letter bearing on the subject of pyorrhea alveolaris from Dr. W. D. Miller, of Berlin, Germany, explained the relations existing between Dr. Miller and himself, paying a high tribute to his ability as an investigator. No other man, he said, has demonstrated so much in the etiology of dental caries. During the past two or three years he has devoted some time to the study of pyorrhea alveolaris, but so far he has not been able to substantiate the opinions which he has formed, and what he says in the letter is therefore merely suggestive, and is not given out as an authoritative conclusion. Dr. Miller's present view is that there are three factors concerned in the production of this disease: *First*, a certain predisposition; *second*, a local irritant; and *third*, bacteria. A predisposition to this disease consists in a lack of tonicity.

Continuing, Dr. Barrett said that for himself he believes there is no other disease within the province of dentistry which is giving so much trouble as pyorrhea. Its etiology is hidden in mystery, its course is surrounded with uncertainty, and unexpected results are often seen. He has had unexpected cures, and the other day he had an equally unexpected failure and was compelled to extract the tooth under treatment. Many who have spoken in dental meetings on this subject have talked *ex cathedra*. Some have laid the cause to a certain condition of the system. Thus it is said to be a concomitant of gout and rheumatism. It sometimes is, but not invariably. Others say that it is the result of uterine troubles. This theory might do very well, but for the fact that men have pyorrhea as well as women. Still others who have attempted to



account for the existence of pyorrhea lay the cause to excessive use of saline foods, but the facts show that it is not more prevalent among persons who live largely upon this class of foods than among those who do not. In his own opinion, it is a diathesis. There is a deposit upon the teeth near the gum-margin which produces an irritant effect upon the surrounding soft tissues, and the trouble goes on, the deposit increasing and the irritation growing, until the tooth drops out. It is difficult to tell how to treat every case, but he believes that the first indication is to remove all the deposits. Sometimes the difficulty of treatment is increased because the pockets containing the deposits are hidden. The other day, in treating a case, he found a tortuous pocket extending clear to the apex of the root. Besides removing the deposits thoroughly, he believes that the edges of the alveolus should be dressed to stimulate it and keep it in good condition. But, whatever we do, we will meet with failures, and we shall continue to do so until we know the causes which produce the condition.

Dr. Rhein wished to add a few words to what he had said in his paper. He does not think the etiology of pyorrhea is nearly so obscure as Dr. Barrett believes. He apprehends that the main difference is in classification. The cause can generally be found. If it is not found in some one of the numerous troubles from which patients are frequently found to be suffering, then it may be that the cause has ceased to exist, and has left the disease as a reminder. In such cases the cure of the local expression cures the disease at once. He endeavors to find the general cause, when there is one; and when it is found, he makes the patient go to the proper medical authority for treatment. He believes that the greatest trouble is that frequently dentists to whom these cases come do not take the necessary time to find the primary cause. If they do find this cause they can cure the disease if the cause can be removed.

On motion of Dr. Marshall the subject was passed temporarily.

Dr. Nathan Jacobson, Syracuse, read a paper entitled "The Early Diagnosis and Treatment of Tumors of the Jaw." [This paper appeared in the DENTAL COSMOS for February.] Previous to the paper, Dr. Jacobson read a witty letter from Dr. H. D. Didama, of Syracuse, who was prevented by illness from taking part in the meeting.

Dr. T. W. Brophy, Chicago, thought that of all the papers he had ever read or heard on the subject that of Prof. Jacobson stood first in order of merit, superior to any other he had ever heard, though there are some minor points in which he cannot agree with the author. Thus, the speaker believes that tumors in the oral cavity have their origin in diseased teeth more frequently than from all



other causes combined. The question when a new growth presents in the mouth is how to distinguish between that which is malignant and that which is benign. In determining this, an important point is the history. Is it not true that the most eminent pathologists differ in their diagnosis? Witness, for example, the case of the late emperor of Germany. The gentleman who read the paper said, if he understood correctly, that epulis had its origin from the bone. The speaker's clinical experience leads him to believe that the origin of epulis is in the periosteum of the bone, not in the bone itself, and he is of the opinion that, in operating, if the periosteum be thoroughly removed with the tumor, the trouble will be completely eradicated. But if the gum-tissue and pericementum in the locality of the lesion are allowed to remain, the disease is almost certain to recur. He wishes to urge the importance of the procedure which he has just advised, and also the importance of prompt attention to any troubles of the teeth. From information which he has received, he believes that had General Grant given his teeth proper attention he might be living to-day. Those who have large experience see almost every day cases of similar character. Sometimes a little ulceration appears upon the mucous membrane opposite the third molar, upon which there is perhaps a sharp, jagged point caused by decay, which keeps up a constant irritation, so that the simple ulceration, at first easily managed, in time becomes a malignant tumor. He could indorse what Dr. Jacobson said about epithelioma being benign in the beginning, and that if removed early it will not recur.

Dr. John S. Marshall, Chicago, thought Dr. Jacobson had left almost nothing to be said on the subject of tumors in the mouth, but the speaker wished to correct the statement made by Dr. Brophy about the origin of the disease which resulted in the death of General Grant. He had been informed by Dr. Allport, who was General Grant's dentist for several years before his death, that none of the general's teeth were in condition to provoke the formation of a cancerous growth upon the tongue. In fact, the disease was located too far back in the fauces to have been the result of irritation from a rough or diseased tooth.

Dr. Jacobson replied to the criticisms of Dr. Brophy by reading portions of his paper, showing that it was a misunderstanding which occasioned the objections of the latter.

Dr. Brophy, replying to Dr. Marshall, said that he had learned from Dr. Abbott, who was called by Dr. Barker to examine General Grant's teeth, as there was a suspicion that they might be at the bottom of the trouble, that one of the molars was badly decayed and abscessed, and this must be recognized as at least a possible factor in the causation of the disease which followed.

Dr. Barrett corroborated Dr. Brophy as to what Dr. Abbott had said about the trouble in General Grant's mouth, which commenced with an ulceration near a molar tooth. The disease was located and developed upon the right side of the tongue, from which point it spread, in consequence of the constant and long-standing irritation of that organ by the three upper molars on that side of the mouth, all of which were projected from their sockets (there were no teeth under them) from one-fourth to three-eighths of an inch. They were very much coated with black, rough tartar, badly decayed and broken down. As to the case of the Emperor Frederick, a paper read at the late meeting of the American Dental Association said that Dr. Thos. W. Evans, who was the emperor's dentist, had stated it as his belief that the origin of the affection which resulted fatally was a diseased third molar. He had listened to Dr. Jacobson's paper with a great deal of pleasure, and he moved that the thanks of the convention be tendered to its author. So ordered.

Dr. E. T. Darby, Philadelphia, read from proof-sheets an editorial article on the National Association of Dental Faculties, written by Dr. W. Xavier Sudduth, for his journal, which was presented by request of its author, as his contribution to the meeting.

At the conclusion of the reading, Dr. Darby, referring to the subject of competition among the dental colleges, said that he had no doubt that all who have the good of the profession at heart are in favor of longer terms for the college sessions. He had it in his heart to say that there are too many colleges, even though it might be charged that he was actuated by selfish motives. There are too many colleges only because they make a competition for students which should not be found in professional schools. The moment that element is introduced, professional education is degraded. His reason for thinking that there are too many schools is that most of them depend upon the fees received from students for the means to pay their expenses, and there is consequently an unseemly scramble for students, with the result that some of those accepted are not the proper material to make good dentists. In some of the smaller cities where colleges are located the tendency has been to give too little education, especially on the practical side. They have not the facilities, not sufficient patients for the clinical needs of the students. If he were to mark out an ideal course in dentistry, he would extend the term to seven or perhaps nine months, and require three years' study. Some schools expect to send out their students as good dentists with less than ten months' actual study, but it cannot be done. He is therefore thoroughly in favor of extending the time of study. By making the period of study three years, the student would be able to get one year of practical instruction in the

laboratory, which is just what he needs. Then give him two years' instruction in the higher branches. Those who have made for themselves a name and a reputation as dentists without the help of higher education, and whose ability is well known, may say that they had no need for these things and that they don't care for their sons who are to succeed them to spend their time in acquiring them, but it must be remembered that conditions have changed. The demand is now for a higher grade of average attainments than was necessary a generation ago, in order to maintain a proper professional standard. He would not say that more anatomy, or more physiology, or more chemistry is needed, but he would give students a month or two more in dental histology and work in the histological laboratory than is now possible.

He has not said these things to point out objectionable features in the course of any special school, but simply to show how inadequate is the length of time devoted to the education of students of dentistry to properly teach them what they ought to be taught.

Dr. Marshall was not aware that he had anything new to add to what he has in other places said upon the subject of dental education. Some may not agree with him that dental students to-day need a more thorough knowledge of the fundamental sciences of medicine than they are receiving. Dr. Darby says they have enough anatomy, physiology, materia medica, etc., in the courses as now prescribed, but the speaker thinks that in most at least of the purely dental colleges the students only get a sort of a kindergarten knowledge of these subjects,—that is, merely the first principles. He believes that dental students should be examined in all the fundamental branches just as the medical men are; that in these studies they should be educated as medical men. It is not necessary for them to take obstetrics or gynecology, but they should have everything pertaining to the principles of surgery. If he could have his way he would require that all students intending to become dentists should take the medical degree first, and then begin their special training. Let them have the fundamental principles first before beginning their special studies. If one of you had a defect of the eye, would you go for treatment to one who only knew the anatomy of the eye? Certainly not; you would go to the best-educated man you could find, who with a medical degree as a foundation had taken the special studies of the oculist. There is a tendency in the educational ranks to advance. He was glad to see at the Louisville meeting of the Faculties Association that at least some of those in charge of the educational interests of dentistry showed their appreciation of the needs of the hour. There is only one way to stop the tendency to overcrowding the profession, and that is for the schools to combine and fix the standard so high that



not every one who wishes to enter the dental ranks because he looks upon dentistry as an easy road to a livelihood can do so. He is sorry to see that some of the schools accept students who have not the necessary preliminary education. The best medical schools do not take that class of material. Why do we not educate our students in that way if we want to be recognized as the equals of medical men in culture? How many men are there with only the degree of D.D.S. who could diagnose and treat the tumors described by Dr. Jacobson? Very few. And yet they are not to blame for this. The schools, he was about to say, are responsible. But this would not be quite true. It is the system of dental education that is at fault. We begin at the wrong end; we put the cart before the horse by beginning our special training before we have laid a broad and deep foundation of the fundamental sciences upon which all departments of the healing art should be built. By this system of education we cannot expect to take rank as medical men and be competent to treat all those diseases of the mouth and adjacent parts which are the legitimate province of the dental and oral specialist. The arguments urged against medical training for dentists have no real or sensible foundation. It takes time and money to prepare for any of the learned professions, and if one would excel he must be thoroughly prepared for any emergency. Shall the dental specialist be content with a smattering of that knowledge which if possessed in a liberal degree would make him eminent, and the peer of any in the other professions? No! He has a better opinion of the future practitioners of dentistry than to believe that they will be willing to be hampered by such poor preparation for their life-work as that which clogged the efforts of many of their predecessors. He believes the time is coming, and that right soon, when the public and the profession will demand of those entering our ranks the same liberal education, the same general culture and equal professional knowledge and skill, that they expect to find in the other learned professions.

Dr. J. Branston Willmott, Toronto, had been asked to prepare a paper on the subject of education to be read here, but he had not had the time to do so. He finds himself in a peculiar position. He represents an institution which has been twice voted by the National Association of Dental Examiners as "disreputable." They have placed us on the same plane as Delavan. We have also been rejected by the National Association of Dental Faculties, and he did not know that the applications for membership in those associations would be renewed. In the Dominion of Canada we live under what is known here as a "grinding monarchy." In conducting our school we don't do as we please, but we are obliged to do what the law says. Every student passes an examination which the teachers, because



they are interested parties, have nothing to do with. They have taught the student what he knows, but they have no part in ascertaining whether he has acquired the proper amount of information. We have no competition. The whole matter of dental education in the province of Ontario is placed in the hands of a board elected biennially. This is not a close corporation, but so long as they keep within reasonable bounds they can fix the standard just where they will. The speaker's judgment on this subject is practically incorporated in the curriculum of the Royal College of Surgeons of Ontario. We lay good stress on a preliminary examination, as we think there is no other calling where wide general information is more important than in dentistry. The great bulk of our students are teachers; some of them come from the colleges, but most of them have been teachers, and they have learned to control themselves in the presence of their pupils.

Time is an essential element in the education of a dentist. A student when graduated should be reasonably well qualified to enter upon practice. To become thus qualified involves the training of the mind, of the eye, of the hand, and of the judgment. Perhaps the mental training may be acquired in the usual two years devoted to the education of dentists, but the proper training of the other faculties—the eye, the hand, the judgment—necessitates a longer time. Our judgment is that three years' study of twelve months each should be demanded before graduation. We have adopted the English apprenticeship system as a further aid to the manipulative education, and we require attendance at two sessions of five months each exclusive of the time spent in apprenticeship. He is quite willing to agree that attendance at two sessions of four and one-half or five months, without other training, is not enough to educate a man to practice dentistry.

Another point to which he wished to direct attention is the importance of an independent final examination. He has on more than one occasion been struck by the small percentage of the students coming up for final examination in the American colleges who fail to pass. In the Royal College of Dental Surgeons of Ontario, the professors who teach have nothing to do as such with the examination of the students for the license of the school. The examinations are conducted by an independent body, and the teachers think they do very well if not more than fifteen or twenty per cent. of the candidates fail to pass. In fact, they usually expect nearly twenty per cent. That proportion of failures is because those who examine have no financial interest in the result of the examination. They are there simply to find out what the candidates who come before them know. If an American school with a class of say two hundred

students were to "pluck" fifty, what would be the result? The next year there would be a much smaller class, but a correspondingly higher standard. He thinks that if the National Association of Dental Faculties would agree to put the examination of the students attending the colleges under independent auspices, they would do more for the raising of the standard than by any other one thing. He would admit that not much exception can be taken to the course of the better class of dental colleges, but he does think they make a great failure when they come to the final examination of their students; that under these examinations, as now conducted, the D.D.S. does not certify that the young man who receives it has reached a high standard. We are not prepared to lengthen our term beyond five months (exclusive of the examinations, which make it practically six months). If the work is carefully insisted on, in a term of five months the student will get a pretty good grasp of the subjects taught, but these of course do not include the manipulative training before referred to. Oral surgery, as will be seen by reference to the curriculum, has been transferred to the medical course.

One word more about the "disreputable" stigma before referred to. The Royal College is governed in its actions by what the law says. When the members of the Association of Faculties shut down on the application of this college they virtually stamped it as disreputable in their eyes. He wanted to say that the college has formed a union with the Toronto University, and no degree will be conferred until the candidate has spent three full years in the study of dentistry. They hope to be able to relieve somewhat the pressure on the Philadelphia schools. They would be delighted if the colleges on this side of the line would raise the standard of their preliminary examinations. About a score of Canadians have expatriated themselves for the winter because they couldn't pass the matriculate examination of the Royal College of Dental Surgeons. They don't object to the three years' course, if they could only get started.

Dr. W. H. Dwinelle, New York, thought that thirty-odd years ago, in a valedictory address at the old college in Baltimore, he had placed his idea of the standard of dental education above anyone else he knew of. He held then that as the office and privilege of the dentist was to deal with suffering humanity and bring it up to its primal condition, there was no device, no principle, no knowledge, that could be made tributary to that end which should be neglected. There has been a tendency on the part of some of the projectors of dental education to diminish rather than increase the standard. Dentists should be accomplished in all branches of knowledge. This has perhaps not been possible in the past, but we should in the

future raise the standard as high as possible. He indorsed Dr. Marshall's idea. Such a course may not be practicable now, but the future is before us and it may yet be accomplished.

Dr. Barrett thought he need not remind his hearers that the standard of dental education needs raising. In Europe the D.D.S. has fallen into disrepute, so that he is glad to see a disposition to raise the standard to what it should be. It has been too low in the past, and the colleges have had the reputation of granting the degree all too easily. There are men wearing the degree of D.D.S. who can scarcely read or write. Of course, the granting of the degree to such men is not done to-day. Time was when the practice of dentistry was a reproach to a man, but the dentists of that day were not as a rule men of education and refinement. To-day the men in dentistry have some scientific knowledge, and the growth is going on. The time is coming when to be a dentist will be to be known as a man of science all over. The schools are helping in this work, and he hopes to see the time when students will not be received unless they have sufficient education for the full comprehension of all the laws of science; when the competition of the schools will be for the best and most thorough system of instruction, when they will each strive to see which can give the most for the money. He thinks all present have been broadened and enlightened by the discussion, and he moved a vote of thanks to those who have spoken.

Dr. Geo. L. Curtis, Syracuse, in seconding the motion, stated that it was intended to discuss the subject on the first evening of the convention, but it had been deferred, hoping for the presence of some other gentlemen who were expected to take part.

The motion was carried, and the convention adjourned till 9 o'clock to-morrow morning.

In the evening the banquet, to which reference was made in the December (1888) issue, was held in the large dining-room of the Leland Hotel.

(To be continued )

### ARKANSAS STATE DENTAL SOCIETY.

THE Arkansas State Dental Society held an interesting meeting at Hot Springs, Ark., January 16, 1889.

The following officers were elected for the ensuing year: H. C. Howard, president; A. Augspath, first vice-president; J. S. Stillwell, second vice-president; and L. G. Roberts, secretary and treasurer.

Little Rock was selected as the next place of meeting, which will be held on the second Tuesday in May, 1890.

L. G. ROBERTS, *Secretary*,  
Eureka Springs, Ark.



## STUDENTS' SOCIETY, NEW YORK COLLEGE OF DENTISTRY.

At a meeting of the Students' Society of the New York College of Dentistry, held at the college on Monday, February 4, 1889, the following officers were elected for the season of 1889-90:

C. G. Pease, president; D. W. Byrne, first vice-president; G. W. Hann, second vice-president; S. P. Russell, secretary; C. H. Emerson, assistant secretary; C. J. Richardson, treasurer; H. C. Crosseup, librarian.

L. S. ROSENSTICE, JR., *Assistant Secretary.*

## FLORIDA STATE DENTAL ASSOCIATION.

THE sixth annual meeting of the Florida State Dental Association will be held in Ocala, Florida, beginning on Wednesday, April 10, 1889, and continuing three days.

JOSEPH W. PEETE,  
*Cor. and Rec. Secretary.*

## VERMONT STATE DENTAL SOCIETY.

THE thirteenth annual meeting of the Vermont State Dental Society will be held in Montpelier, commencing on the third Wednesday in March (20th), 1889, and continuing three days.

Members of the profession are cordially invited to attend.

THOS. MOUND, *Secretary,*  
Rutland, Vt.

## SOUTHERN ILLINOIS DENTAL SOCIETY.

THE Southern Illinois Dental Society will hold its third annual meeting at Carbondale, April 9, 10, and 11, 1889.

A cordial invitation is extended to all. Exhibitors are invited to correspond with Dr. T. W. Prichett, Whitehall, chairman of the executive committee. Ample accommodations will be provided for clinics and exhibits.

C. B. ROHLAND, *Secretary,*  
Alton, Ill.

## EDITORIAL.

## DYNAMIC ELECTRICITY.

DYNAMIC electricity, by which is understood electric force generated by mechanical power as by a dynamo, in contradistinction to that generated by chemical decomposition, as in the various forms of batteries, is being utilized for the production of light, heat, and power in medical and dental offices, and it is not unreasonable to



suppose is in some instances employed by persons having but faint conception of the laws governing the agent which seems such a tractable and useful servant.

The several forms of street currents are being introduced into offices without a proper understanding of the great difference in their character and the corresponding liabilities in their use.

The unit of measure of electrical force (potential) is expressed by the term volt (as the pressure of steam in a boiler is designated by pounds). The unit of the measure of quantity (volume) is expressed by the term ampère. In the chemical batteries in common use, such as the plunge or bichromate battery, the cell power does not exceed  $1\frac{1}{2}$  volts. If six such cells are employed there is six times that voltage, or say eleven volts. This voltage when compared to the street currents is insignificant. The Edison incandescent current is about 110 volts; the Thompson-Houston current is 2500 volts; the Brush arc current is 3000 volts.

Passing the alternating current, which is not applicable for motor purposes, the two currents in common use are known as the arc and the incandescent. These differ widely, the arc current being distinguished chiefly by its *force* (potential), the incandescent current by its *quantity* (volume).

The incandescent current, as run by different companies, is also by no means uniform, the current varying in different lines from 90 to 300 volts, although the higher grades are used only for street-lighting purposes, and are not run into private houses.

The difference between force (potential) and quantity (volume) may be clearly apprehended from an illustration as to the effect of a given quantity of water upon an object according to the manner in which it is employed. One can readily imagine only a pleasurable effect from the gentle flow of a stream of water from a pipe one or two feet in diameter, whereas if the same quantity of water was driven in the same time through a nozzle of an inch in diameter the results would be disastrous. Precisely this difference exists between volume and force in the two currents under consideration. A volume current of low potential might safely pass through the human body, while a less quantity, if impelled by a high electromotive force, would kill.

Professional men and all others employing electric street currents should understand these points of difference and the special liabilities of the different currents, varying according to the degree of resistance offered, from an unpleasant sensation to an instant, lightning-like destruction.

For the purpose of providing our readers with reliable information on this subject, the subjoined correspondence is submitted:

PHILADELPHIA, January 3, 1889.

DR. M. J. GRIER, 1531 Spruce St., Phila. :

DEAR DOCTOR,—Knowing your long experience and thorough familiarity with the uses of electricity in medicine and in the arts, I venture to ask a frank opinion from you as to the risks of whatever kind you recognize in the application of the arc and the incandescent currents to the various motors in use by dentists and in such other uses as the said currents are employed for in dental and medical offices.

The risks are of course dissimilar, but there is great need of a correct understanding of the liabilities in the use of light and power street currents of either class. You would confer a favor on the dental profession by giving me such a statement of facts in this line as you are so eminently qualified to present, with the privilege of publication.

Yours truly, J. W. WHITE.

JANUARY 21, 1889.

DR. J. W. WHITE, Editor of the DENTAL COSMOS :

DEAR DOCTOR,—In reply to your complimentary letter of January 3, permit me to express the pleasure and surprise resulting from a consequent visit to your establishment to inspect the various uses of the electrical current in its application to dental work. Since thus practically learning of the many purposes for which it is utilized, I more fully appreciate the gravity and importance of your inquiries. In the work of the physician electro-therapeutics does not require and will not permit the use of a high potential current, the application being made directly to and through the body of the patient; a few volts only being required to overcome the varying resistances offered by the skin and other tissues, and a fraction of an ampère in strength being all that is needed to give the desired results. In electrolysis and the use of the cautery a somewhat stronger current is needed, but not more than can be safely and conveniently furnished by properly arranged cells, or by a small storage battery. The surgeon, in resections and other operations on the bones, occasionally makes use of the drill and circular saw, and in such cases would probably use a motor driven by the same energy as that employed by the dentist; hence such use may be considered at the same time. The dentist, working directly in the mouth, carries his tools, all good conductors, directly into contact with moist and sensitive structures, making the risk of accident particularly great owing to the proximity of his work to the cranial and cervical nerves; and as it seems to be especially his good fortune to be provided with all the labor-saving tools that skill and ingenuity can devise, he is perhaps more than any other interested in your inquiries.

The use of the commercial lighting current, as shown by the apparatus exhibited by you, to give the light and heat needed and to actuate the motors employed in the dental office, opens up a fascinating and almost unlimited field of application. The attraction is very great to utilize a power so convenient and apparently so easy to control that almost every one who can may be tempted to employ it. The available sources of current are practically those of the arc light and the incandescent. Unfortunately, these currents, especially the arc light, possess an electro-motive force and strength far beyond the needs of the case, and therein lies the risk of their employment. The danger is not in a successful use of the current by means of properly constructed and carefully guarded instruments; it lies in the unintentional results,—the accidents,—the unexpected which

so often happens,—THE POSSIBLE TRANSFERENCE OF THE CURRENT FROM THE APPARATUS TO THE PERSON OF THE OPERATOR OR THE PATIENT.

We are all familiar with the many reports of cases where death has resulted from the accidental contact with the highly-charged wires, and this generally among those supposed to be more or less acquainted with such risks and the methods of avoiding them. How many accidents occur other than those which are fatal, or the extent and character of such accidents, we may never know, for rarely are any such mishaps short of death reported.

While some experiments have been made and occasional accidental closures have been recorded showing the toleration of exceptionally large currents, it should be borne in mind that they were probably through the dry hands with the presumably thickened palmar surfaces of workmen presenting the greatest resistance, and probably in subjects not very susceptible. The same current might have been injurious or fatal to others. We have very different conditions in dental and surgical operations; such accidental contacts in these cases would lead through moistened and incised surfaces and at comparatively small points, concentrating the effects and producing serious shock if not injury and destruction of tissues, and perhaps loss of life.

The possibility of accidents in these special uses of electricity demands the most careful construction of the apparatus employed, the most thorough insulation of the motor and its connections from the tool-bearing shaft, the employment of such safety devices as may cut out any external accidental increase of current, *and above all the avoidance of the use of such an unnecessarily strong and dangerous current as that furnished by the arc light circuit.* It is not only necessary to avoid death-dealing strengths, but as far as possible to reduce to a minimum those which might be capable of only disagreeable effects. Accidents will happen with the best-regulated systems. Admitting that every precaution is taken within the office to insure the greatest exemption from danger, there are many external causes beyond the control of the most careful and skillful persons, such as tornadoes, storms in winter abrading the insulations and breaking the wires, grounding perhaps a high potential circuit and carrying it directly into the office. The same may happen during thunder-storms; and, in case of fire, heat and falling walls may produce similar results. Other causes might be mentioned, but perhaps enough has been said to direct the attention of the profession generally to the possible dangers attending the introduction and use for motors of electric currents as furnished by the light and power companies.

Very truly yours,

M. J. GRIER, M.D.

1531 SPRUCE ST., PHILADA.

### THE AUTHORITY OF STATE BOARDS.

WE need not emphasize the important bearing of the following decision upon the legality and authority of the various State Boards of Dental Examiners:

An opinion was rendered in the Supreme Court of the United States January 14, 1889, in the case of Frank M. Dent, plaintiff in error, *vs.* the State of West Virginia. In error to the Supreme Court of Appeals of the State of West Virginia. Dent was convicted of unlawfully engaging in the practice of medicine without a diploma, in violation of a statute of the State which requires every



practitioner of medicine to obtain a certificate from the State Board of Health that he is a graduate of a reputable medical college or that he has practiced medicine in the State continuously for ten years, or that he has been found upon examination by the board to be qualified to practice medicine. Dent appealed the case to the State Court of Appeals, asserting that the act was unconstitutional, inasmuch as it deprives him of liberty and property without due process of law, contrary to the fourteenth amendment to the constitution. The Court of Appeals gave judgment against Dent, and this court affirms that decision.

The court, in an opinion by Justice Field, says, "It is undoubtedly the right of every citizen of the United States to follow any lawful calling he may choose, subject only to such restrictions as are imposed upon all persons of like age, sex, and condition. This right may, in many respects, be considered as a distinguishing feature of our republican institutions. Here all vocations are open to every one on like conditions.

"The right to continue the practice of professions is often of great value, and cannot be arbitrarily taken away any more than real or personal property can; but there is no arbitrary deprivation of such rights where its exercise is not permitted because of a failure to comply with conditions imposed by the state for the protection of society. The power of the state to provide for the general welfare of its people authorizes it to prescribe all such regulations as may be necessary to secure the people against the consequences of ignorance and incapacity as well as of deception and fraud."

In this connection the following remarks by Judge McGary, of Washington, in a paper on "Are Medical Laws Constitutional?" published in *Hearth and Home*, September 15, 1884, are worthy of consideration:

"The state may doubtless create a Board of Health, or a similar body, and require every physician to register his license with the board, or in the office of the county clerk, or other appropriate place. But his right to practice will not depend upon his registration, as the right has been already vested and assured by the diploma of the college. And should the state also vest this Board of Health with the right, and even duty, of examining and licensing applicants, it could not apply to those who held a license from the incorporated colleges. Nor could it militate against or invalidate in any way the right of the colleges to issue valid diplomas and licenses, before or after; for not even can the state, by its legislation, divest or impair a vested right which the colleges already had."

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### "THE RECORD."

THE Students' Society of the New York Dental College began in October, 1888, the publication of a twenty-two-page journal entitled *The Record*, to be issued monthly until and including the following March. As the first dental students' journal in the world, the enterprise is extremely creditable to the society as indicative of a most commendable determination on the part of incoming members of the dental profession to cultivate a habit of making contributions to dental literature. The typographical appearance of *The Record* is excellent; the matter of the three successive numbers compares



favorably with that of its contemporaries,—is in fact on a higher ethical and literary plane than some of them,—and its editorial conduct is certainly praiseworthy. Address Thaddeus P. Hyatt, No. 245 East Twenty-third street, New York, N. Y.

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### A GERMAN-AMERICAN DENTAL SCHOOL.

THE Deutsch-Amerikanischen Zahnarzt-Schule is the name of a new enterprise in dental education in Chicago. We have just received the prospectus, which states that the college was organized and incorporated with the view to obviate the difficulties that students of German birth experience in mastering the English language. All instruction is given in German. Dr. F. W. Huxman, No. 167 Clark street, Chicago, is the secretary.

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### POST-GRADUATE STUDY.

WE have been gratified by the reception of votes of thanks from dental college students to whom—in accordance with our long-established custom—we have gratuitously sent the DENTAL COSMOS during college sessions.

The number thus supplied for the current term, 1888–89, aggregates over eighteen hundred per month.

It may not be deemed inapposite if we here remark that from its beginning the DENTAL COSMOS has taken the front rank as an educational publication, and neither pains nor expense has been spared in the endeavor to incite and sustain the highest aspirations for professional proficiency in every department of dentistry. In this respect every number of the journal is an unimpeachable and enduring witness. We have just received from an old subscriber an expression of his high appreciation of our new subject index; and no wonder, for, as he informs us, he has himself compiled such an index for his bound volumes of the Cosmos during the last twelve years. Such studious labor in that direction is no longer necessary for him, but we cordially commend his spirit in continuing a course of post-graduate study and reading which included a painstaking mastery of the minutiae of periodical literature pertaining to his profession. A like gratification is manifested by the dean of one of our oldest dental colleges, who writing to express his high estimate of our monthly index, adds, "When the Cosmos comes we stop work to read it."

We cannot too earnestly impress upon the minds of dental graduates the vital importance of a studious perusal of current dental literature.

## A NEW DENTAL JOURNAL IN CANADA.

WE have received the first number (January, 1889) of the *Dominion Dental Journal*, which is to be issued quarterly, at the price of one dollar per annum. Its editor is W. George Beers, L.D.S., of Montreal, and it has as co-editors C. S. Chittenden, L.D.S., of Hamilton, Ontario, and A. C. Cogswell, L.D.S., of Halifax, Nova Scotia. Communications relating to the business department must be addressed to the journal, P. O. Box 298, Toronto, Canada.

We cordially salute our new Canadian contemporary, whose editors are well known to many of our readers, and wish the *Journal* an influential and successful career.

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BIBLIOGRAPHICAL.

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A TEXT-BOOK OF OPERATIVE DENTISTRY. By THOMAS FILLEBROWN, M.D., D.M.D., Professor of Operative Dentistry in the Dental School of Harvard University. Written by invitation of the National Association of Dental Faculties. With 330 illustrations. Octavo, 269 pp. and index. Philadelphia: P. Blakiston, Son & Co., 1889. Price, cloth, \$2.50.

The author was invited by the National Association of Dental Faculties to undertake this work, and the volume before us is the result. It is designed for use as a dental student's text-book, yet "is not intended as a substitute for larger works, but as an epitome of the practical application of the principles discussed at length in more extensive volumes, and to these the student is referred for exhaustive discussion."

The book is a practical one, and the original descriptive matter so terse as to give a first impression of the lack of comprehensiveness; but further consideration leads to the conviction that things essential have been included, and due discrimination has been exercised in eliminating those not necessary in the judgment of the author. Illustrations of instruments and appliances, obviating the need for description, are freely used. This condensation occasions the employment of but little more than half the whole number of pages in strict exposition of the subject title. The author, however, includes crown- and bridge-work in his definition of "Operative Dentistry," and the remainder of the book consists of a collocation—chiefly from the DENTAL COSMOS,—of illustrated descriptions of such work.

We are by no means certain that the epitome proper would not have been more available for and consonant with its declared purposes if published by itself.

Acknowledgment of valuable assistance is made; especially of that rendered by Dana W. Fellows, M.D. "The portions treating of the anatomy and physiology of the teeth and contiguous parts and deciduous and permanent dentition were written entirely by him." Many in isolated fields, engaged in general surgical and medical practice, will find the work very valuable.

We commend the volume to all who are interested in its subject.

The paper and typography are of the excellent order characteristic of the well-known publishers.

A COMPENDIUM OF DENTISTRY for the use of Students and Practitioners. By JUL. PARREIDT, dental surgeon to the Surgical Polyclinic at the Institute of the University of Leipzig, etc. Authorized translation by LOUIS OTTOFY, D.D.S. With Notes and Additions by G. V. BLACK, M.D., D.D.S. With numerous illustrations. Octavo, pp. 217 and index. Chicago: W. T. Keener, 1889. Price, cloth, \$2.50.

This volume is a concise and clear epitome of theoretical and practical dentistry as understood and practiced in Europe and America, by the distinguished author and his translator and annotator. The latter gentlemen are sufficiently well known in this country to afford a guarantee that the work embodies the generally received views and methods of the present time. The book is especially well adapted for the information of medical practitioners who may desire to have an intelligent appreciation of dental practice, and for use by army and navy surgeons, to whom such a systematic treatise, within such reasonable compass, would prove invaluable. It is well printed, on good paper, and would be no mean addition to any dental library.

TRANSACTIONS OF THE AMERICAN DENTAL ASSOCIATION, at the Twenty-eighth Annual Session, held at Louisville, Ky., in Joint Session with the Southern Dental Association, commencing on the 28th of August, 1888. Philadelphia: The S. S. White Dental Manufacturing Co., 1889.

The Transactions of these two national associations at their joint session last summer are here presented in the most voluminous of the annual issues of the American Dental Association reports, and make a book of two hundred and eighty-six pages. Those who wish to preserve a record of this memorable meeting can procure copies of this report, in cloth, by remitting \$1.25 to Dr. George H. Cushing, secretary, No. 96 State street, Chicago, Ill.

## OBITUARY.

## FLAVIUS SEARLE, D.D.S.

DIED, at Springfield, Mass., February 10, 1889, Dr. FLAVIUS SEARLE, in the seventy-fifth year of his age.

Dr. Searle was born in Southampton, April 4, 1814. His boyhood was passed in his native town. His studies were intended to prepare him for the ministry, meanwhile supporting himself by teaching. He entered Amherst College, and subsequently Marietta College, but his health did not permit him to continue at either. He then began the study of medicine, but early made a specialty of dentistry under the tutorship of Dr. Walker, of Northampton, who was both physician and dentist. After his graduation from Dr. Walker's office, he commenced the practice of dentistry in Springfield.

Dr. Searle was the inventor of various methods and appliances, but gave everything that he devised as contributions to the advance of his profession. For several years he made all his own instruments, and in 1851, being in need of a new operating chair, and there being none in the market, he made one for himself. Of this chair he said, "I used to go to church and try to be good, but that chair would go with me, and be working its parts together before the whole congregation." In this chair his last patient sat.

A remarkable tribute was paid to Dr. Searle, in October, 1887, by the Connecticut Valley Dental Society, of which he was the founder and first president, in a celebration of the fiftieth anniversary of his professional life.

Dr. Searle was a man of retiring disposition, gentlemanly demeanor, and sympathetic nature. He was earnest and conscientious in the practice of his profession, tenacious in his views, but open to reason,—a progressive conservative.

No man in his profession was more highly esteemed by his brethren, and in the community in which he lived he was regarded with an affectionate reverence.

## R. L. McCLELLAN, D.D.S.

DIED, at Cochranville, Pa., February 5, 1889, of pneumonia, ROBERT LEWIS McCLELLAN, D.D.S., in the sixty-seventh year of his age.

Dr. McClellan was born in West Brandywine township, Chester county, Pa., October 20, 1822, and was in many respects a man of mark. He began the study of dentistry in 1847, in the office of Sharpless Clayton, of West Chester, Pa. He subsequently removed



to Cochranville, and in 1850 became the successor of Dr. R. W. McKissick at that place, and was not long in establishing an extensive practice in Chester, Delaware, Bucks, Lancaster, and Montgomery counties in Pennsylvania, and Cecil county in Maryland.

Dr. McClellan was a member of the Pennsylvania Association of Dental Surgeons, which was active in establishing the old Philadelphia College of Dental Surgery, of which he was a graduate at its last session in 1855-56. Many prominent names are on the roll of his students,—among them being Dr. Bing, of Paris, Dr. T. Lewis Baker, of West Chester, and Dr. S. P. Chalfant, of San Francisco.

Politics had no little of Dr. McClellan's attention. He was a member of the Pennsylvania House of Representatives from 1861 to 1863, and of the Senate from 1874 to 1876. He was also interested in surveying and in the settlement of estates, which frequently occupied his time outside of his hours at the chair and in the laboratory. He was twice married, his first wife being Miss Downey, of Lancaster, by whom he had two daughters who are now living, and his second wife was a sister of the late Judge Futhey, of Chester county. He was a member of the Presbyterian Church, and belonged to the orders of Masons and Knights Templar.

Dr. McClellan's funeral was largely attended, evincing the high respect in which he was held in the community in which he spent his days in a career of activity and usefulness.

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#### DR. E. H. LEWIS.

DIED, at Mobile, Ala., January 25, 1889, Dr. E. H. LEWIS, in the sixtieth year of his age.

Dr. Lewis was born at St. Albans, Vermont. He studied dentistry, and was a student in the office of Dr. Gilman, of St. Albans, during 1849 and 1850. He had been in practice for many years at Aberdeen, Miss., and Mobile, Ala.

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#### DR. E. BRASSEUR.

DR. E. BRASSEUR, of the Medical Faculty of Paris, Director of the Dental School of France, President of the Société Odontologique, etc., who died suddenly January, 1889, at the age of forty-eight, is thus written of in the *Revue Odontologique* :

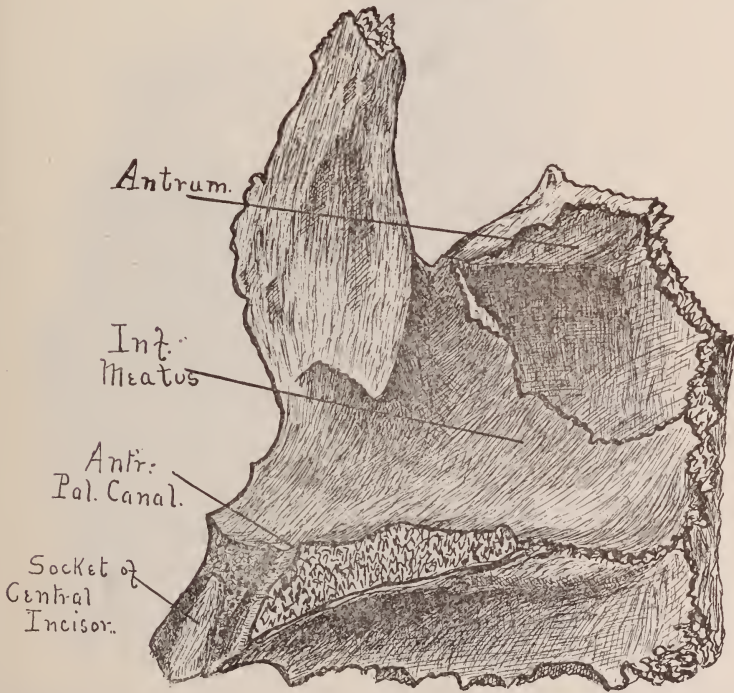
"In losing him we are deprived of the kindest of masters. In the midst of his unbounded devotion to work he maintained a genial intercourse with all his associates. Judged worthy to occupy the first place among us, he was also the first in labor and toil. From the beginning he directed with indomitable ardor the school

of which he was one of the principal founders. His tact and good judgment under all circumstances have contributed largely to the prosperity of the institution for which he evinced a fatherly solicitude."

## PERISCOPE.

IMPLANTATION SURGICALLY CONSIDERED.—We copy the following extract from a lengthy paper on implantation by Dr. Rodrigues Ottolengui, published in the *Brooklyn Medical Journal* for February, 1889.—ED. DENTAL COSMOS.

*Fig. A.*



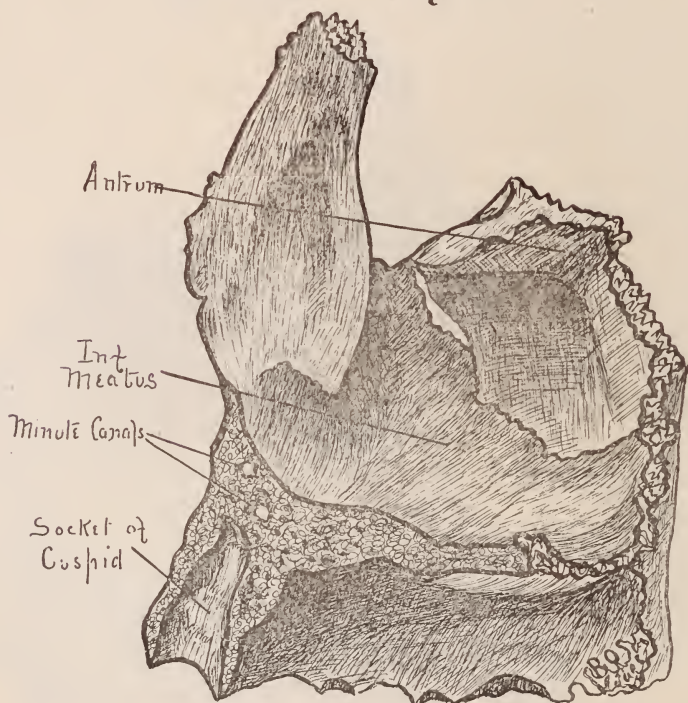
*The anatomy of the maxillæ.*—The anatomy of the jaws becomes a point of vital interest to those who undertake this operation. I have failed to find any drawings in our text-books which sufficiently show these parts. I therefore obtained a number of bones, made sections of the same in various directions, and have chosen the ones from which I made the accompanying drawings to illustrate the points which I think it essential to know.

Fig. A is the superior maxilla. Section was made through the center of the central incisor socket and through the anterior palatal canal. A portion of the bone has been broken away so as to more

thoroughly expose the antrum. Examination of the figure will demonstrate the value of the following suggestions:

The labial plate of the alveolus is very thin in the normal sockets of the central incisors. It should be so made in the drilled socket, care being taken to avoid cutting through to the gum, however. The direction of the palatal canal is an angle a trifle greater than that of the socket, and yet the slant of the adjacent teeth may be taken as a guide. The chances of entering this canal are conspicuously present in two conditions, first where the teeth originally were prominently forward, and it is desired to set the new members less so. The temptation here would be to bur the socket backward towards the palate, and this would be towards the canal. In this operation the

*Fig. B.*

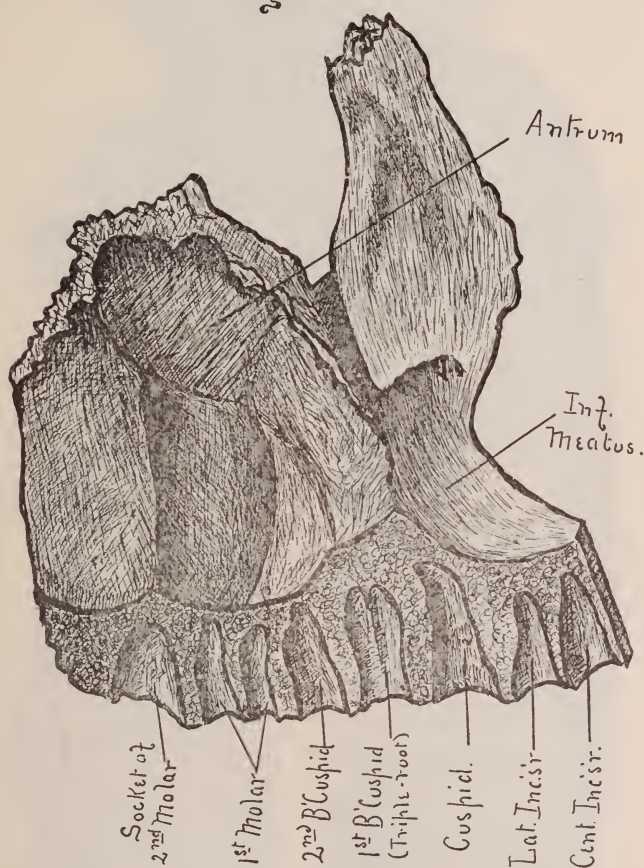


end may be safely attained if in reaming backward care be taken to work towards the lateral incisors and away from the median line. It is better to set the teeth with a slight tip or with a trifling intervening space than to risk rupturing the vessels in this canal. The other condition is where the space between the laterals is wider than can be filled by two teeth. The temptation here, for appearance' sake, is to set the centrals close together, leaving spaces between them and the laterals rather than to have all the space between the centrals. This in many instances would, however, be risky. Such a case was presented to me for operation at a clinic, and I was criticised for setting the teeth as I thought safest, with a



space at the median line. If, in such a case, it be noticed that at the median line a well-marked ridge of the gum is continuous with the frænum extending over into the roof of the mouth, there becoming the central line of the rugæ, it may be taken as certain that originally a space existed, the maxillæ not being closely united and the canals being properly large. Such was the case in the clinical operation alluded to, and such my conclusions, the existence of space

*Fig. C.*

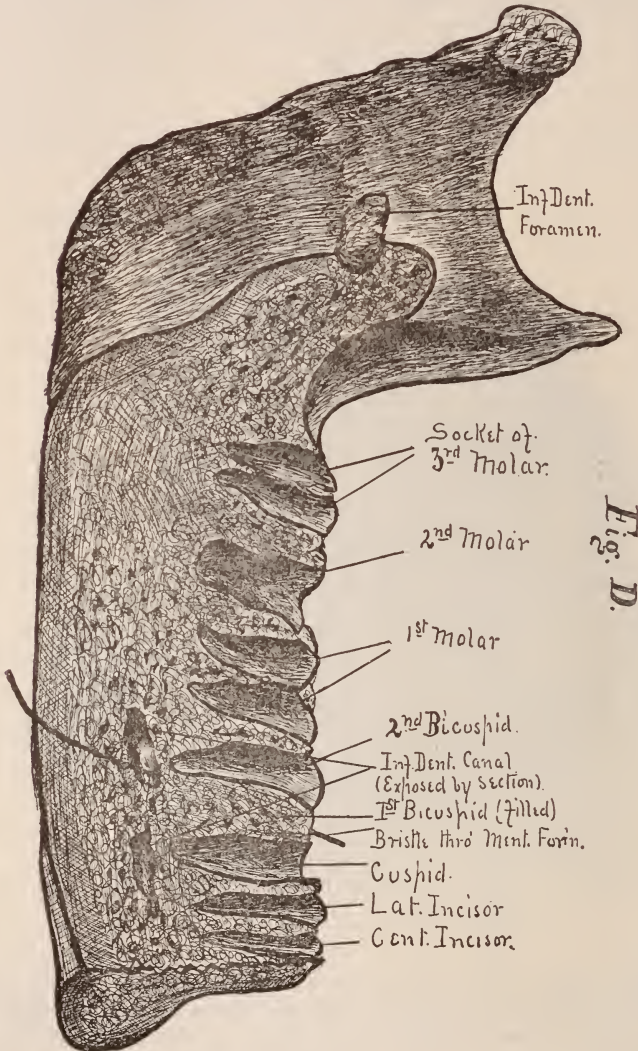


originally being verified by questioning the patient. Care of course should be taken not to select a tooth with so long a root that drilling a socket would endanger the cavity of the nares, which is not distant.

Fig. B shows a section through the center of the cuspid socket. The points of interest shown by this illustration are the comparative absence of danger of entering either the nares or the antrum. Of a large number of sections made, the two canals shown in this drawing are the only ones I have been able to discover at any point within the bone. We know, however, that a complete vascular supply



exists, as anyone who has ever enjoyed the midnight companionship of an aching tooth would testify. An excellent drawing showing this interosseous system can be found in Gray's Anatomy (Fig. 344), or the same plate may be seen in The American System of Dentistry, vol. i (Fig. 143). I believe I am correct in saying these vessels have



no fixed canals, but penetrate the bone of the process. I call attention, therefore, to these two canals which I discovered (they can be traced but a very short distance with a bristle), because their presence seems to indicate that in the cuspid region the nerves are larger than elsewhere. The nerve comes down from the region of the antrum, and divides into posterior and anterior dental, imme-

diately over the cuspid, and I consider the two canals shown as containing these nerves. Great care should then be taken not to drill too deeply even in this apparently safe region. On one occasion I am sure that I touched one of these nerves, and the result was a painful neuralgia, persisting till antipyrin was exhibited.

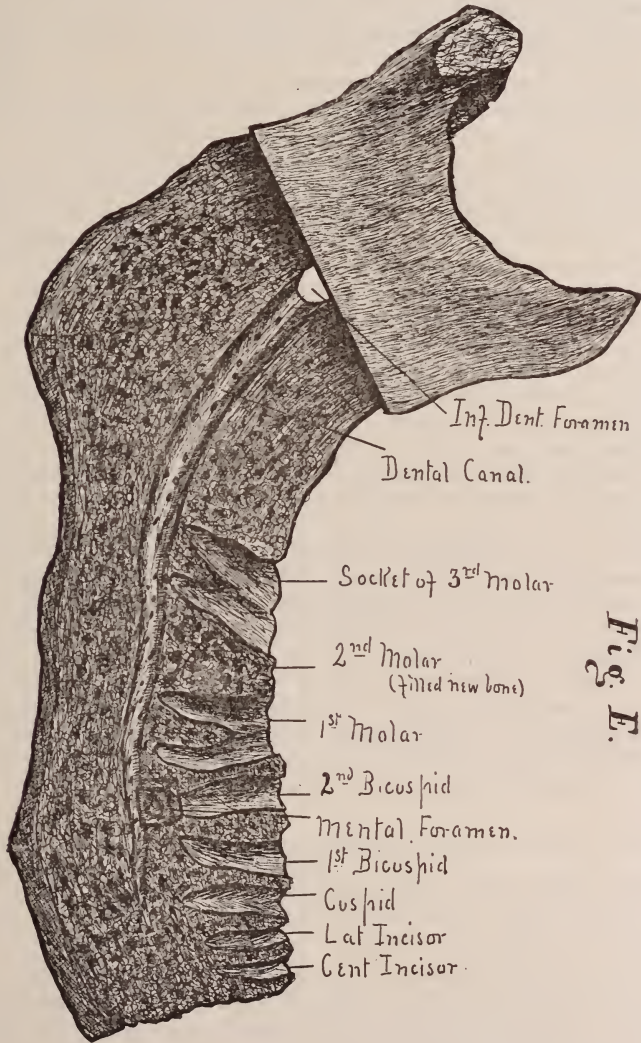


Fig. C is a section through the center of all the sockets of the teeth, the palatal portion of the bone being removed. The relative positions of the extremities of the teeth and the cavities of the nares and antrum are here readily seen. The bicuspid, especially the second, are the teeth we are most often called upon to implant, and yet they are the ones offering the greatest danger, the proximity to

the floor of the antrum being so difficult to determine. I suggest, as a slight guide, the fact that the lower portion of the malar process, readily found with the finger, is one floor of the antrum, though *not the lowest*.

Fig. D is a section of the lower maxilla, the lingual portion of the bone having been removed. It will be seen that, though section has been made through the center of the sockets, the dental canal has been exposed only in the bicuspid region. In the molar region the canal curves forward, and occupies a position not in the center of the bone but nearer the outer surface. Therefore, in the implantation of lower molars, it will be safer to slant the burring instrument towards the tongue, rather than to drill straight down and risk rupturing any of the very important vessels in this canal. In the bicuspid and cuspid region the canal is directly under the teeth, and in the incisive region it is lost in the bone, no complete canal being seen. Immediately behind the central incisors, on the median line, I have found in all my specimens foramina analogous to the anterior palatal in the upper bone. These are not figured in Gray or any other work which I have seen, but seem to be constant in the bones. It would seem probable, therefore, that small branches of the vessel here find an outlet and supply the adjacent soft tissues.

Fig. E is a section of the lower maxilla, the buccal portion of the bone having been removed. In this case the dental canal is seen throughout, as it is in this portion of the bone it lies. I consider that I have been most fortunate in securing this specimen, as it emphasizes an opinion I had formed from clinical experience. On one occasion, in drilling a socket under the antrum (though I was to implant a *first* bicuspid this did not seem probable), I first noticed great resistance, the bone being quite dense; suddenly my instrument darted forward as though having passed through a thin layer, and before I could prevent it I had entered the antrum. If the reader will examine the appearance of the socket of the second molar in Fig. E, it will be seen that a dense superficial layer of bone covers what in the rest of the original socket is the most cancellous portion of the whole bone. This possibility, not always present (see Fig. D, socket of bicuspid), should be borne in mind, and great care taken during the operation to prevent such an accident as I have outlined.

A NEW AND ONLY WAY OF RAISING THE EPIGLOTTIS.—In a lengthy illustrated paper read before the Medical Society of London by Dr. Benjamin Howard, and published in the *British Medical Journal* for November 17, 1888, the study of which we commend to all who administer anesthetics, the author describes fully a procedure which he terms "A New and Only Way of Raising the Epiglottis." We make the following extracts, the entire article being too lengthy for our pages.—ED. DENTAL COSMOS.

The epiglottis, mysteriously described by the ancients as "standing at the gateway of life," attracted from a very early period a good deal of curious attention and speculation. Concerning its functions Hippocrates wrote, Plato disputed, Galen experimented, but nearly all of them disagreed.



As a factor in apnœa—to which my remarks will be confined—the introduction of anesthetics gave to the epiglottis a new, familiar, and momentous interest; but, in contrast to the contentions which, down to the time of Magendie and Pinel, continued about its functions, what was taught at first respecting the epiglottis and the method for its supposed elevation in apnœa has been taught ever since, and is everywhere taught now. This teaching, which to-day governs universal practice, is, I think, correctly expressed as follows:

1. When the unconscious state deepens into the insensitive state called apnœa, the epiglottis falls backwards and closes the glottis.

2. In this condition the elevation of the epiglottis is the first thing in order and in importance, as, without this, respiration, whether natural or artificial, is impracticable and the result fatal.

3. The only way by which the epiglottis can be raised is by means of the tongue; as the tongue is brought forwards the epiglottis is moved upwards.

\* \* \* \* \*

I started with no theories; I have none to suggest now; and in submitting just the facts, I guarantee their correctness only as regards the completely insensitive state, except when I state otherwise.

The diagrams before you I made from drawings which I sketched at the time of examination, and from nature in each instance, and their accuracy will, I think, be in no particular contradicted by the actual dissections before you. By their aid we will consider:

1. The effect of traction of the tongue; what is done by it, and what is not done by it.

2. A new and only way of raising the epiglottis.

3. Some other important changes in the relations of certain parts of the upper air-passages to each other induced by a position which I call complete extension of the head and neck.

\* \* \* \* \*

I will now anticipate the question already doubtless in your minds, and will endeavor to show:

2. *A New and Only Way of Raising the Epiglottis.*—That the essential condition of life—an open glottis—may, in whatever extremity, be surely maintained, there is a distinct mechanism, superficial, always available, so that, whether by volition, instinct, reflex action, or by the effort of another person, the fallen epiglottis may be instantly, surely, and completely elevated.

The central part of this mechanism is the body of the os hyoides. This is the central link of a three-linked chain. By the lower link, the hyo-epiglottic ligament, the body of the freely-movable hyoid bone, is attached to the freely-movable epiglottis below; while the upper link, consisting of three pairs of muscles, the genio-hyoidei, mylo-hyoidei, and the anterior bellies of the digastrici, proceeding from the body of the hyoid bone, are attached to the body of the inferior maxilla above. Thus, the body of the inferior maxilla above is coupled to the epiglottis below.

As the attachments of these muscles to the inferior maxilla are near and on either side of the median line, where is the greatest range of motion, it follows that, if the head be extended but a certain distance, the chain in question becomes straightened and



tense. Beyond this point, however slight the additional extension may be, the epiglottis is raised in unison. Continue the extension sufficiently, and the epiglottis becomes instantly, completely, inevitably erect.

As if in anticipation of the critical emergencies connected with apnœa, this special provision is so strictly mechanical, that whether the extension of the head be by volition, instinct, reflex motion, or by the action of another person, whether in health, apnœa, or after death, the same cause produces beyond prevention precisely the same effect.

\* \* \* \* \*

*The Way to Make Complete Extension of the Head and Neck.*—Having, by bringing the patient to the edge of the table or bed, or by elevation of the chest, provided that the head may swing quite free, *With one hand under the chin and the other on the vertex, steadily but firmly carry the head backwards and downwards. The neck will share the motion, which must be continued until the utmost possible extension of both head and neck is obtained.*

The degree of extension to be made simply to correct commencing stertor or irregularity of breathing must in each case naturally be left to the judgment of the operator. Simply shutting the mouth or pushing up a flexed chin may of itself give relief in some cases, because by either of these—as also by jerking forward the angle of the lower jaw, or by turning the head over upon the face—a jarring motion is communicated to the tongue; and by close watching I have observed that, if the head be not too much flexed to allow it, this in some cases causes the occluding tongue at some point in the mouth, but more often in the pharynx, to be slightly dislodged, the water test showing that the air-way at that point has thus been slightly opened and is more permeable.

That there may be no possible mistake, however, about the all-important raising of the epiglottis, I wish this to be very precisely and distinctly understood; assuming the mouth to be shut and the inferior border of the inferior maxilla to be at a right angle with the cervical column, as in the average recumbent posture, the head must be continued to be extended from 30 to 35 degrees more before it is possible for the epiglottis to be affected at all. Not until after the skin from the symphysis to the sternum is quite tense do the relaxed muscles in question beneath it become tense at all. These being tense, from this point the elevation of the epiglottis begins. In a nut-shell: Make the line of skin from the chin to the sternum as straight as it can be made, and the complete elevation of the epiglottis is assured.

It is always better to make the extension rather more than rather less than appears to be necessary, because, while an excess can never do any harm, a slight insufficiency might bring to the operator failure, and to the patient death. The further effects of extension, as I have described them, upon the tongue, the velum palati, and the entire pharynx, with the establishment of a free post-oral air-way, I wish particularly to emphasize, cannot with certainty be secured except by making the extension of the head and neck quite complete, as directed.

\* \* \* \* \*

I have called this way a new way, then, because, with the how and the why in it, this procedure enables us for the first time imperatively to raise the epiglottis, and know that we raise it. I have allowed myself to call this way the only way; but not lightly. That it is nature's way is plainly seen in the frequently intense trismus, when apnœa threatens death,—which in our ignorance we have deemed it imperative, by some means, or by any means however violent, to resist and overcome. Every day this (nature's way) is seen, too, in the position instinctively assumed by the croupous, the diphtheritic, the asthmatic; in the position taken just before extraordinary efforts by the opera-singer, the wrestler, and, too, in that of the dying. That, except through the hyoid bone, any surface procedure for raising the epiglottis is impracticable, I am confident; that it is the only available way known to us, I feel sure; that any way could be more prompt is indisputable; that any way could be more simple, it would be hard to imagine. What I have endeavored to show may be summarized as follows:

1. Contrary to general belief, traction of the tongue, however and whatever the force employed, does not and cannot raise the epiglottis as supposed. . . .

2. The only way by which the epiglottis can be certainly raised is by extension of the head and neck; by this means its elevation is instant and complete. . . .

3. By extension of the head and neck carried to the utmost, the remaining obstructions from the backward-fallen tongue, the velum palati, and uvula, are also simultaneously removed, and the entire pharynx is enlarged throughout.

\* \* \* \* \*

I have been asked, only this afternoon, to answer to-night a question, and if you will excuse an unintended digression, I will do so now. The question is this: If the pulling forward the tongue, as always practiced, does not always raise the epiglottis, how do you account for the relief it always and unquestionably affords, the very evidence of which is in the continuance of its universal practice? I answer, the relief alleged I admit, in some cases, but in some cases only, and then it is not by raising the epiglottis. In commencing irregularity of breathing the cause of obstruction is sometimes chiefly one thing, sometimes it is chiefly another. When, as often happens, the chief cause is a backward-fallen tongue, if the tongue be pulled forward that cause is removed; but mark, nothing more is done, except that by the usual depression of the body of the lower jaw in the doing of it, any tendency to a falling of the epiglottis has been already favored.

And now in turn let me make one remark, and ask also one question. Unfortunately, it is not true that pulling forward the tongue does afford relief always; on the contrary, there are occasional cases in which it does no good at all, and it is these occasional cases which not exclusively, but chiefly, concern me.

For example, out of over thirteen thousand cases of death from asphyxia which during the past three years occurred in England alone, I have selected over one hundred, unequivocally attributed to the administration of anesthetics—cases which, beyond reasonable doubt, received the most skillful treatment, and in which the tongue was

conscientiously pulled forward in the recognized way,—but they died. Of what did these unfortunate persons die?

I commenced this paper with the axiom, with which you all undoubtedly agree, that “in the insensitive state, or complete apnœa, the epiglottis falls backwards and closes the glottis.” “That in this condition the elevation of the epiglottis is the first thing in order and in importance, as without this, respiration, whether natural or artificial, is impracticable, and the result fatal.”

The question I have asked I should be sorry even to pretend to answer. How many of these deaths may have been due to alleged “constitutional peculiarity,” or the always convenient and indisputable “heart-failure,” I cannot judge.

From all the facts which I have now presented, however, I am unable to avoid the belief that, in every instance, the epiglottis was not raised, but continued unlifted till death was complete. The perplexing, painful obscurity enshrouding many of these deaths may, I think, hereby be somewhat lightened, and a certain proportion of them at least be fairly and intelligently accounted for.

It is a happy feature that instruments—the delays in getting them and in using them, the occasional violence and the wounding with them, yet the utter helplessness without them—are, in the procedure recommended, so entirely superseded.

These facts emphasize the still further observance of the well-known fact that the nose, not the mouth, is to be used for breathing. Before administration of anesthetics, not the heart only, but the upper air-passages should be carefully examined. From the commencement and throughout inhalation the head should be as low as is consistent with convenience, and so arranged that no obstacles exist to instant complete extension, should it seem expedient. With these precepts observed, stertor will be an unusual occurrence, and always under control. As far as it goes, this applies also to ordinary sleep, in which the habitual snoring of some persons may be largely avoided simply by the use of a sufficiently low pillow.

From long habit, to most operators the inaccessibility of the tongue will be a cause of disquietude. To such I commend an actual inspection of its disposition as I have described it on the fresh cadaver, and as regards any obstruction from it, they will be at rest.

The order to be observed in the treatment of suspected apnœa is—1, to secure a completely free air-way; 2, to induce the respiratory act by reflex action; 3, artificial respiration. Heretofore, with an unsuspected but closed air-way, incomplete respiratory effort with slight heaving has sometimes been induced, but no breathing. Artificial respiratory motions have been practiced, but often without respiration or exchange of air; hence have resulted inexplicable deaths.

The most important facts I have submitted are:

1. That, contrary to universal belief, traction of the tongue cannot raise the epiglottis.

2. By sufficient extension of the head and neck, whether by volition, instinct, reflex action, or by the effort of another, whether in the healthy, the dying, or the dead, the epiglottis is instantly, and beyond prevention, made completely erect.

3. By complete extension of the head and neck the tongue and



velum are as respiratory obstructions, simultaneously with the epiglottis, removed; and without a moment's delay the entire air-way can be straightened, enlarged, and be made free throughout by the nearest person.

4. If syncope happens to be the chief factor, or only incidental, this also gets thus the quickest and best corrective.

The author expresses the hope, as he has the confident belief, that the facts above submitted will be found to be permanent additions to our means of averting death.

In a subsequent number of the same journal, Dr. Frederic Hewitt, lecturer on anesthetics at the London Hospital, comments as follows on Dr. Howard's paper:

(1) It does not follow, because complete extension of the head and neck can be produced in the relaxed and dissected subject, that the procedure can be effected in the apnœic patient. Many conditions may be present in the latter case which would be absent in the former. When Dr. Howard's paper was under discussion I referred to one of the most important causes which may prevent complete extension of the head and neck; and if I may be permitted I will again mention it. With general anesthetics, and more especially with ether and nitrous oxide, much tonic spasm of the muscles of the jaws, neck, floor of mouth, and other parts may accompany, and in some cases actually be the cause of, the arrest of breathing; and although in minor and transient cases of this nature tilting back the head may be accomplished, in many other instances it will be found perfectly impossible to perform this "utmost manual extension." In short-necked, full-blooded persons—more especially if ether be employed—respiration may become so impeded that, if certain precautions (to which I shall presently refer) be not observed, a condition of apnœa may readily arise, and, despite all attempts at throwing the head back, may persist unless other means be adopted for its relief. I have known the neck-muscles become so rigid that extension of the head was, for this reason alone, impossible. This condition of tonic spasm is rarely met with under chloroform, for reasons which I cannot enter upon here.

(2) Without wishing to deny the general utility of the procedure under consideration, it will, I think, be found that in many cases extension of the head and neck, although practicable, will fail to secure the admission of air to the lungs. In the first place, the nasal passages may be partially or completely obstructed by pre-existing morbid conditions. In the next place, such tumefaction of the nasal mucous membrane may arise, if ether be employed, that more or less complete occlusion of the nasal air-way will result. Moreover, there may be—and I am again here referring to ether—such an abundant secretion of thick frothy mucus that the nasal passages will, when thus obstructed, become inadequate for purposes of respiration. Lastly, granting that the epiglottis is the cause of the apnœa, the extension of the head and neck may fail to dislodge it. I would again most strongly urge that it is a mistake to compare the relaxed post-mortem subject with the patient in whom respiration has become suspended under an anesthetic. In the latter case the epiglottis, the aryteno-epiglottidean folds, and other adjacent parts



may be, and usually are, engorged and increased in size, and may thus prevent the entrance of air to the larynx, even though extension of the head and neck is practiced. The effect of etherization upon the size of the tongue is often very marked, and may be taken to illustrate what I mean. But there is, I believe, another factor in the arrest of breathing at the superior aperture of the larynx which may possibly help to explain the failure of head-and-neck extension in some cases. Granting that the epiglottis is closely applied to the larynx, or that the base of the tongue is in contact with the pharynx, or that these conditions coexist, all automatic (or reflex) respiratory efforts would have the effect of increasing the difficulty, for the epiglottis and tongue would be sucked more tightly towards the larynx, and extension of the head and neck might not, in obstinate cases, bring sufficient force to bear upon the tongue and epiglottis to overcome the obstruction. Dr. Jameson, in the *Journal* of last week, describes a case in which head-and-neck extension failed to restore breathing, although tongue-traction and artificial respiration proved successful. Possibly nasal obstruction existed, but, in the absence of this cause for the failure of the remedial measure, I would submit the above explanation for consideration. Utmost extension of the head and neck in the post-mortem room doubtless causes the epiglottis and tongue to recede from the larynx, and will also be found to do so in certain cases of apnœa; but there is, I submit, no proof that this extension will have a like effect when the conditions to which I have alluded are present.

In conclusion, therefore, I am inclined to regard extension of the head and neck as serviceable only in particular cases, and I think it would be wrong to rely too much upon it. Apnœa occurring during the administration of an anesthetic may or may not be due to some anatomical obstruction; and, were we to rely upon head-and-neck extension in non-obstructive (paralytic) apnœa, we should be committing a serious error, and losing most valuable time. I do not say that the advocates of this procedure recommend its employment in such cases, except as an adjuvant to artificial respiration, but my contention is that, as matters at present stand, there is much probability of head-and-neck extension being regarded as infallible in re-establishing respiration. Putting aside embarrassed and temporarily suspended breathing, there can, I think, be no doubt that the more permanent and serious state of apnœa should, in the first instance, be met by chest-compression, by which a threefold purpose may, and usually will, be served. By this practice not only will the administrator be at once able to decide whether any obstruction to breathing is present or not, but, should the epiglottis obstruct the air-way, it may be forced from its dangerous position by the escaping pulmonary gases; and, should no further impediment exist, air will be drawn in by the ensuing inspiration, a point of paramount importance. If air enters the lungs by this chest-compression, artificial respiration may be proceeded with; but if it does not, the nature of the obstruction must be ascertained, and the case dealt with accordingly. Given that the arrest of breathing is obstructive, and is not remedied by chest-compression, head-and-neck extension may be of use if the mouth is not available. But what can be said of the remaining cases, those in which chest-compression and head-

and-neck extension have failed? Seeing that such cases of obstructed breathing will yield, if the mouth be open, to measures applied through the oral cavity (hooking forward the tongue or epiglottis with the finger, tilting forwards the base of the tongue and hyoid bone with the handle of a spoon, sponging away mucus, and possibly intubation of the larynx), I cannot avoid the conclusion that the safety of the anesthetized patient will be best consulted by providing for, or producing when need be, an oral as opposed to a post-oral air-way. Such an air-way may be provided for by placing a small dental gag between the teeth or gums prior to administration, and, even though the mouth may not be used (the patient breathing through the nose), the air-way is always available. In short-necked, plethoric patients, more especially if they possess good and accurately fitting teeth, much embarrassment to breathing may arise under ether, and I know of no better way of preventing this from becoming a formidable danger than by the preliminary insertion of a small dental gag. If the teeth are deficient, the mouth may at any moment be opened by the finger or a mouth-gag.

**AXIAL ROTATION OF THE SUPERIOR CENTRAL INCISORS.**—Among the anomalies of the dental organs which are susceptible of regulation are those which have received the name of *anomalies of direction*. According to their nature they are divided into anomalies of *retroversion*, *anteversion*, *lateroversion*, and *axioversion*. It is to this latter class that the case I will relate belongs.

Occasional attempts have been made to reduce such cases by means of pressure devices having a slow and progressive action. These are generally constructed of metal or vulcanite, and are provided with a pressure-screw whose object is to give to the tooth a gradual and continuous pivotal movement the reverse of the abnormal motion. These devices have not, so far as known to us, given satisfactory results, especially when the extent of the rotation exceeds the twentieth of a degree. Some authors have published observations, accompanied by illustrations, of apparent successes in such cases; but we have found in none of them any facts conclusive enough to add to our faith. There is, indeed, an obstacle to the successful regulation of such anomalies by such means. It consists in the elasticity of the ligaments of the tooth, which tend to return it persistently to its first abnormal position when the apparatus ceases to act. These devices have, besides, the inconvenience of aggravating certain inflammatory phenomena of the gums or soft parts of the mouth by their prolonged application. For these reasons we have for a long time rejected, for cases of this kind, the orthopedic style of device, preferring the immediate luxation of the irregularity.

Miss D., age 9½ years, without traumatic antecedents at any period of childhood, presented the anomaly of a double axial rotation of the upper central incisors, as exhibited in Fig. 1.

The peculiar character and extent of this deviation precluded all thought of regulating by slow rotation. There was no hesitation in deciding upon a rapid luxation. At the same time the idea of anesthesia, either general or local, was rejected, for these reasons: the movements and disturbances of the mouth which follow the appli-

cation of chloroform render the delicate operation of quick luxation impracticable; and, as to local anesthesia by injection of cocaine, it is not less objectionable by reason of the local inflammations and general accidents which often follow the application of this agent.

However, to produce more tranquillity in the little patient, the ordinary simple refrigerant of ice and marine salt, in equal parts, was applied for some minutes to the gum.

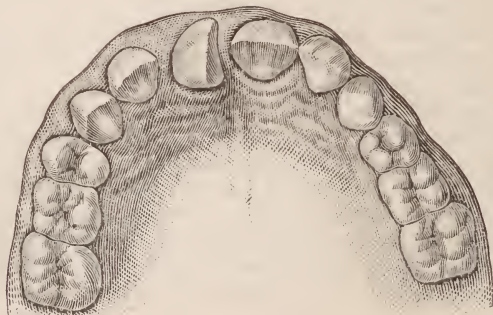
The left incisor was first attacked. For this purpose the beaks

FIG. 1.



of the forceps were lined with cotton wadding bound in place by waxed silk thread. The object of this precaution was to avoid all lesion of the tooth by contact of the instrument, as well as its removal too suddenly from the alveolus, as often happens in simple extraction. By slow lateral movements the ligamentous attachments of the tooth were broken up, until, attached only at the apex, it was easily reduced by simple torsion of the vasculo-nervous pedicle,

FIG. 2.

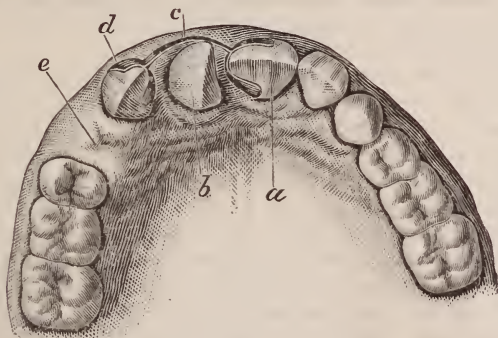


and was then replaced in its normal position. The hemorrhage was insignificant. A bandage of waxed silk in shape of the figure 8 held the tooth in its new place. Frequent washing of the mouth by phenated and iced liquid was prescribed. No inflammatory reaction followed, and ten days after the operation the consolidation was complete. (See Fig. 2.) Four days later the right incisor was inspected for operation, but it was at once apparent that the space between the replanted tooth and the right lateral was not sufficient



to accommodate the movement of the right central. The right temporary cuspid was therefore removed to provide the necessary space, and a simple pressure device was made use of as follows: two halves of a flat gold ring, connected in front by a curved platinum strap, were adjusted upon the left central and right lateral so as to push the one from the other. Simple pressure upon the platinum

FIG. 3.



strap served to divert the teeth, and thus by gradual and continued force we obtained at the end of eight days sufficient space for the two teeth. The incisor first replanted showed no damage whatever from the pressure. Fig. 3 shows the apparatus in place. The second incisor was removed and replanted precisely as in the first instance, only, the deviation being greater, the operation required more time, and the hemorrhage was more abundant, though easily

FIG. 4.



arrested. The same figure-of-8 band was used to keep the tooth in place, and phenated lotions alternating with a cold solution of chlorate of potassium prevented all inflammation. In ten days the bandage was removed, and the tooth was solidly in place. Needless to say, the physiognomy of the child was completely transformed. See Fig. 4.—*M. Magitot, in the Journal des Connaissances Médicales, Paris.*



IMPLANTATION OF METALLIC CAPSULES IN THE HUMAN JAW.—In March, 1886, the idea first occurred to me of implanting *metallic* roots in the human jaw. Since that date I have carefully considered the possibilities and probabilities of such an operation. After examining many specimens of encysted metallic bodies, such as silver ligatures and lead bullets, I concluded that *lead* would be the most suitable of all metals to become encysted in the tissues. First, because of its peculiar antiseptic properties. Secondly, it is softer and more pliable than any other metal, and will therefore be more easily adapted to the walls of the alveolus. Thirdly, after oxidation commences, inflammation begins to subside.

Concluding from the above observations that the operation would be successful, I determined to operate at the first opportunity. A favorable case presented itself on October 21. The patient, Miss Julia Pregne, of this city, age about twenty, general health good, had the root of a first right superior bicuspid extracted and replaced by a metallic capsule.

My method of implantation is as follows: Where the natural roots are extracted, a platinum capsule is made the same shape as the root extracted. The capsule is first dipped in hydrochloric acid and then in melted lead, and then serrated with a wheel bur. It is then ready for insertion. Before inserting thoroughly syringe the socket with a five per cent. solution of carbolic acid, or, if there has been an abscess, a solution of bichloride of mercury,—one part to six thousand may be used. The socket is then cocaineized with a six per cent. solution of hydrochlorate of cocaine; this is most readily done with a saturated pledget of cotton, allowed to remain from eight to fifteen minutes.

The capsule is now to be inserted and then burnished perfectly to the walls of the alveolus. The patient after this should be seen daily until all inflammation has subsided. Should any undue inflammation occur, local antiphlogistic treatment should be carefully followed out. I consider the local application of ice most efficient. After the capsule is firmly encysted, the crown may be inserted,—the length of time may be three or four weeks. You will see that by allowing this time for rest, before inserting the crown, is to carry out one of the first principles of surgery.

For implanting metallic capsules in the tissue where the teeth had been previously extracted, I first inject five minims of ten per cent. solution of cocaine. I use spiral knives Nos. 1 and 2, devised by Drs. Walker and Younger, and reamers Nos. 2 and 3. Trephines Nos. 4 and 5; also tubular knife No. 3.

After the socket has been formed and thoroughly syringed, as before directed, the impression of the socket formed is to be taken with modelling composition in the following manner: A piece of soft wood is made small at one end, forming a shoulder about one-half an inch from the end. The small end must be smaller than the socket which it is to enter. The modelling composition is made soft and placed around the small end of the wood, and pressed into the socket. In this manner an accurate impression of the socket may be obtained.

This impression serves as a model, and is molded in sand in the usual manner.

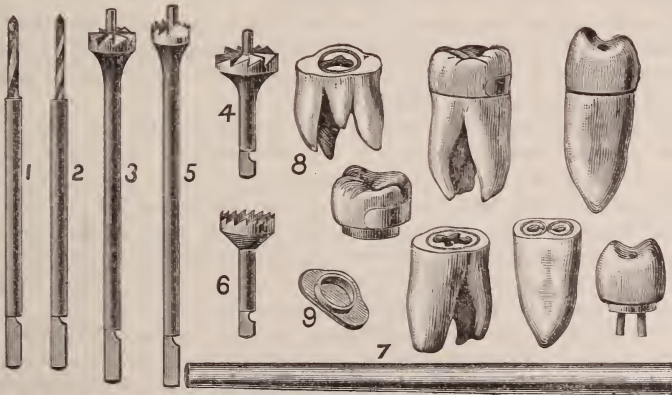
A zinc cast is then made, the platinum foil is made to fit this cast and soldered with silver, dipped in hydrochloric acid and then in melted lead, following the directions previously given in this paper.

I believe by this method a new field in the possibilities of dentistry is opened, and any number of metallic capsules may be thus implanted, without injury, as the basis for a full upper or lower denture, or both. My idea is to implant four metallic capsules, two in the posterior part of the arch,—one on either side,—two in the ante-



rior about the location of the cuspid teeth. The denture to be constructed as follows: A rim of gold twenty-two carats fine, twenty-eight standard gauge in thickness, may be swaged to fit the gum, and four abutments soldered to it to correspond with the implanted capsules, and to telescope in the same. Countersunk teeth may be attached to the gold rim with pink rubber, or the rim may be made entirely of platinum, and continuous-gum teeth may be attached.—*Dr. J. M. Edmunds, in "The Record," Students' Society, N. Y. C. D.*

**METHOD OF ATTACHING CROWNS TO TEETH.**—After drilling out the nerve-canal I cut the tooth down smooth, even with the gum, by the use of an instrument known to the profession for many years (Nos. 3 and 4). I then cut a groove around the pulp-canal with an instrument known as the circular saw (Nos. 5 and 6), made to size neces-



Nos. 1 and 2, Canal Drills. Nos. 3 and 4, Facers, for planing the tooth. Nos. 5 and 6, Circular saws for cutting the groove. No. 7, Metal rod for making ring. No. 8, Root with circular groove. No. 9, Ring, with cover attached.

sary, thus giving lodgment for a ring of metal. After this ring is made sufficiently low (about one-sixteenth of an inch) to correspond with the smooth surface of the root, I put a cover, soldered to ring, upon the crown surface of the root so as to cover it completely (No. 9).

If strength is required, a pivot can be easily applied to the cover in such a way as to project into the pulp-canal.

A tooth soldered to this cover will give as perfect results as have ever been obtained by any other method of crowning teeth. This crown will be found strong enough to carry any reasonable amount of bridge-work.—*H. F. Maasch, in "The Record," Students' Society, N. Y. C. D.*

**TREPPANNING OF THE RADICULAR EXTREMITIES IN THE DENTAL ALVEOLAR PERIOSTEUM.**—In 1881, in a communication to the Congress of Algiers I proposed a new method of treatment of chronic periostitis of the dental alveolus, consisting in the actual section, *in situ*, of the diseased radicular extremity by the aid of a crown trepan.

This method has been imperfectly described in the article on teeth in the Dictionary of the Medical Sciences, pp. 316 and 378, since it is there said that "I practice the resection from the summit by means of a previous trepanning of the alveolus giving access in the chamber to a Liston forceps." Nothing like this is said in my communication nor in a sketch which appeared in the *Lyon Médical* (1881). The same crown trepan which perforates the alveolus at the point chosen as nearest the sectional radicular extremity also continues its action into the root itself. The operator is warned that this section is accomplished by a change of resistance felt by the hand. It may happen that the trepan driven by the dental engine at three thousand revolutions a minute may go too far and come out from the side of the mouth. This happened to me in an operation shown at the Dental School of Paris. Although the definite result had been excellent in this case, to avoid the accident I have added to the trepan a movable ring fixed so as to allow the instrument to penetrate only to a determined length.

The portion of the root on which the trepan acts is taken away with it. If the section is carried on the summit itself, the reparation is prompt; if it is below, the summit will soon be detached by supuration and drawn outside.

Mr. Magitot, defending the graft by restitution for which I proposed to substitute trepanning, has imputed to this latter the production of great destruction, not permitting a judgment of the extent of the evil, and to have been practiced only a small number of times, and too infrequently to form a judgment of results. I will reply simply that the destruction produced by the operation is very trifling; that we can judge *à priori* of the point to which we should carry the trepan; and, finally, that my observations are of the number of forty-five, some of which have been followed with preservation of the teeth for six or seven years, and without change of color.

While with grafting by restitution the pain which follows removal and re-implantation is acute and continues several days, requiring often alleviating treatment, after trepanning there remains only the sensibility due to traumatism; there is no pain attending the concussion of the tooth, and the patient can, in a few minutes after, eat with the treated organ. Finally, in no case are we exposed to the loss of the tooth. This process is more applicable to simple roots which, preserved, will serve to sustain a pivot tooth.

**Conclusions.**—Trepanning of the radicular extremity of teeth is



a simple operation, without danger, leaving no pain after it. Its results are good (I have had nothing but success with it); and, finally, its indications are more extensive and its efficacy greater than those of other processes employed to preserve the teeth.—*Dr. Cl. Martin, Lyons, France; translated from Transactions International Medical Congress, 1887.*

A CORRECTION FOR DR. TALBOT.—In a work recently published I remarked that, in general, American authors evince a complete disregard of the works published in France on Stomatology. This reproach should not be addressed to Dr. E. S. Talbot, of Chicago, who has published in the DENTAL COSMOS an important article on the Etiology of the Irregularities of the Maxillaries and the Teeth. In the October number of the Cosmos Dr. Talbot gives a very complete bibliography of the authors who have treated this subject, and I have had the satisfaction to find a reference in the body of the work to the memoir which I published in 1888 under the title, "Right-handedness and Left-handedness: Are they functions of Education or Heredity?"

To the very natural satisfaction which I felt in finding my American brother taking notice of my work, has succeeded a surprise, not less natural, in observing that he attributes to me some opinions which I never expressed, and which are not mine. I know by experience how difficult it is, sometimes, to understand thoroughly the thought of an author expressed in a language imperfectly known; but to ascribe to him in his work opinions which are not there is excessively unreasonable. Dr. Talbot has been deceived by himself or others.

He says, first, that having measured the teeth of the right and left maxillary, he found them of the same volume. But he does not state the method he used to obtain this result, and I pass that point with the remark that I used the scales to determine the volume of the teeth. It is precisely according to the strictness of this method that I have been able to obtain such exact results; they can be obtained only by this method, or by one still more precise, if it exists.

But what I protest against is making me say, "That the greater number of individuals being right-handed, aliments are carried to the right side of the mouth, and the mastication of that side produces enlargement of the volume of the teeth and maxillaries."

I have never entertained this opinion, and my article does not even mention it. It is therefore not necessary to refute Dr. Talbot's arguments, which otherwise are of no great value. I have always thought, and still think, that a person having all the teeth, devoid of pain from pressure, masticates on the right and left sides alternately. There is naturally some division of the work. The maxillaries operate simultaneously only on soft substances which offer slight resistance.

It is not the same with individuals who have carious teeth. By a reflex action, mastication is made on the side where the pressure is but little, or not at all, painful. Beginning in a passing accident, the habit may become fixed; but in the normal state mastication is made alternately on both sides. I do not believe that right-handed-



ness or left-handedness may have an influence on the predominance of the masticatory action.

To determine this question would require a comparative examination, from the physical as well as the mechanical point of view, of the masticating muscles of right- and left-handed people, and the condition of their dental system. The other terms of the problem are known, since we know from my researches and those of certain anatomists that in right-handed people the teeth are more bulky on the right side than on the left; that the right maxillary is more developed than the left; and that the reverse is observed with respect to the left-handed.

With animals we observe this same division of labor between the maxillaries. It appears by some very interesting experiments on the parotid secretion of the horse, by M. Kaufman, that this animal grinds his food alternately on the right and left sides, and that at each change a corresponding inversion manifests itself in the secretion of the parotid glands. It is hardly probable that these researches have not been made known in America. I repeat them here for my own satisfaction, and I hope that the other French authors cited by Dr. Talbot may be better understood there than I have been.

By means different from those employed by me, Dr. Rollet has confirmed the fact advanced by me that there are *half* right- and left-handed people. Admitting that man at his birth is symmetrical,—that is, ambidextrous (which is not, perhaps, absolutely proved)—and after examining the hypotheses by means of which we can explain the disturbance of the equilibrium toward the right side or the left, Dr. Rollet thus terminates his chapter on the study of the right- and left-handed: “We are content to record the facts clearly proved by observations, and say that if symmetry—absolute equality of the two halves of the body—expresses the law of conformation of the human form, it exists in nature only very approximately even in the most perfect subjects.”—*Dr. Galippe, in the Journal des Connaissances Médicales, Paris.*

**DANGERS FROM THE USE OF COCAÏNE.**—1. Certain persons possess an idiosyncrasy to cocaïne which cannot be foreseen or entirely guarded against.

2. Cocaïne exerts its toxic effects upon the nervous centers and, secondarily, the heart.

3. Its evil effects are most liable to be seen in neurotic subjects.

4. The danger in cocaïne poisoning is mainly from paralysis of the heart, syncope.

5. It may be well to precede its use by the administration of alcohol or other cardiac stimulant, as is done with chloroform.

6. Special care is needed in “weak heart” and organic heart-disease.

7. The subcutaneous administration is dangerous and should be avoided.

8. The use of the stronger solutions is dangerous and unnecessary.

9. The treatment of cocaïne poisoning consists of measures to rouse the heart, especially inhalations of nitrite of amyl.—*College and Clinical Record.*

## HINTS AND QUERIES.

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**BRIGHT-METAL SCREW POSTS AND COPPER AMALGAM.**—In view of the fact that the Bright-Metal Screw Posts owe their introduction to my suggestion, it seems due alike to the profession and to the manufacturer that I should offer a word of explanation, and of further caution regarding their use.

Dr. W. H. Trueman, of Philadelphia, reports three cases in which "Bright-Metal" screw posts had been used as anchors for large crown fillings of copper amalgam. Upon examination about a year afterwards, he readily removed the fillings and found in the roots and in the fillings only blackened cavities with mere shreds of the screws left in them; in one instance not a vestige of the screw remained. In all the cases, after the copper amalgam had become hard, the fillings had been faced with alloy amalgam to conceal the invariably dark color of copper amalgam.

Dr. R. Mathews, of Wichita, Kansas, reports the dissolution of a screw post that had its inner end in a Townsend's amalgam filling which occupied the apical portion of the root, the enlarged canal of which was filled with oxyphosphate cement surrounding the post, the crown having been largely built up with gold, in the grinding of which, for articulation, the end of the post was exposed. Subsequent examination revealed the nearly complete absence of the post, its place being filled with an inky fluid.

Dr. Trueman infers from his experience that there is incompatibility between the "Bright-Metal" posts and copper amalgam, and thinks that dentists should be cautioned against that combination. He adds that he has used the posts with other amalgams and does not recall a case in which they have failed.

Dr. C. R. Butler, of Cleveland, Ohio, gives information of the discoloring of a root in which a crown had been set on a Bright-Metal post, as it appeared. Several other cases have been reported wherein Bright-Metal posts used as retaining screws in teeth having more or less of their crowns remaining, had occasioned a green discoloration which was very unsightly and annoying to the operators. Immediately upon information of the first instance of the kind, a caution was published in the *DENTAL COSMOS* advising the disuse of Bright-Metal posts as retaining screws because of such possible discoloration. Other posts were furnished and recommended, which being made of 96 per cent. platinum could be used as retaining screws without fear of discoloration.

The Bright-Metal posts were made of absolutely pure nickel, but as the commercial nickel was made from ore contaminated with arsenic, it was suggested to the manufacturer by me that if the posts were declared to be made of nickel, commercial nickel might be used by some with unfavorable results. The posts were therefore termed "Bright-Metal," and no question was made as to their safety, because all the salts of pure nickel are harmless. At the outset I experimented with the metal and found it to be practically unchanged after long immersion in mercury and in weak solutions of acids, alkalies, and sugar, so that there was no reason known to me or to experts or by recognized authorities for anticipating any untoward results from their use in the mouth. The readiness with which nickel may be soldered with gold solder or even pure gold evidences its high resistance to oxidation, and this, taken in connection with its well-known unchangeableness in contact with air or moisture under ordinary circumstances, seemed to preclude all question as to its permanency in the roots of teeth for the purpose in view. It nevertheless appears to have been proven that under some

circumstances the wonderful dissolving power of the oral fluids will produce from pure nickel its green oxide, or seemingly carbonize it to the degree of complete destruction, and these surprising facts should restrict the employment of nickel screw posts to cases in which no such results can possibly follow. The copper amalgam complication is likewise inexplicable, and clearly contra-indicates its use with nickel screw posts. The incidents cited afford reasonable ground for considering pure nickel posts liable to failure under circumstances which cannot be foreseen, especially if copper amalgam be associated with the Bright-Metal posts.

Concerning the amalgam of copper and mercury as a filling-material, Dr. True-man further says that although it turns black, he does not recall a case in which it has discolored the tooth when *used alone*. It will darken teeth by showing through thin walls, but this may be prevented by lining the walls with cement, —zinc phosphate for instance. In several cases the copper amalgam had been used as a foundation filling, allowed to become quite hard, and completed with gold or an alloy amalgam, and in these cases he had observed a tendency to discolor the tooth-substance. One tooth so filled has turned greenish blue, the discolored portion being at least an eighth of an inch from the copper amalgam, and in contact with gold malleted on with the electric mallet. In cases lined with cement, the teeth are not discolored. He adds that if the two amalgams are inserted at the same time, the alloy amalgam will not harden.—W. STORER How, D.D.S.

IMPLANTATION NOTE.—Dr. H. A. Smith, in his paper on "Implantation," read at the joint meeting of the American and Southern Dental Associations, referred to a case reported by me. The patient was a colored man, seventy-two years old, for whom an upper right central tooth was implanted September 26, 1887.

It is worthy of note that the tooth was extracted from a man about to be hung, and was kept in an old chest which had not been opened for seventeen years preceding the date of the implantation. At that time it was difficult to find a tooth suitable for the operation, and a casual remark brought to the recollection of an old dentist the fact of that extraction. His search in the old chest was rewarded by the discovery of the tooth referred to, which is at this time doing good service, and not distinguishable from the other teeth. The man is a cotton-picker, and worked with his head down for many days after the implantation, which was not followed by any untoward symptoms whatever.

A freshly-extracted lateral implanted in the jaw of a healthy middle-aged man December 18, 1887, remained but seven months. In fact, my only failures have been with teeth recently extracted.

Dr. E. C. Kirk implanted for me an upper right lateral which came out eight months afterwards, and another was immediately implanted in its reformed socket by a neighboring surgeon of expertness and experience in surgical operations of both major and minor degree. The tooth is firm, of good color, and the gum healthy in appearance. From September 6, 1888, to the present time the tooth has occasioned me no inconvenience, and I would rather submit to the operation twice every year than wear any removable plate.—H. C. HERRING, Concord, N. C.

WEARING ARTIFICIAL TEETH DURING SLEEP.—In the Hints and Queries department of our November (1888) issue, F. E. asked the question, "Should patients be instructed to wear their artificial teeth during sleep, or to remove the same?" To this query we have received the following answers:

Dr. H. A. Beamer, Cynthiana, Ky., says, "Rubber plates should always be left out during sleep. It is the constant application of the plate to the gum that

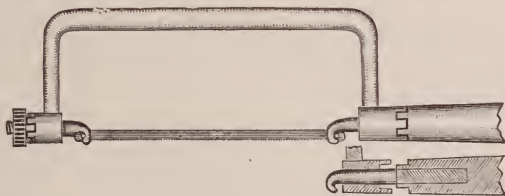


causes the much talked of rubber sore mouth. I have seen the worst cases of rubber sore mouth cured in a few months by leaving the plates out at night, and those who do this from the start have as healthy gums as if they had never worn an artificial plate. I have not seen an exception to this rule."

W. S. H. writes: "To say nothing of the uncleanness commonly resulting from the continued confinement of mucous secretions under close-fitting dental plates during the seven or more hours of nocturnal rest, there is to be considered the obvious healthfulness of exposing the compressed and irritated tissues to the tonic influence of the atmosphere by temporarily removing the plate. Why not as well wear the shoes and stockings all night, as go to bed with an artificial denture in the mouth?"

Another correspondent says, "In the case of partial dentures not secured in position by clasps or otherwise, patients should not be instructed to wear their artificial teeth during sleep, because of the danger in restlessness of the slipping of the denture into the trachea or œsophagus. In the case of full sets, assuming that the plate is well adapted in every way, and provided that due attention is paid to its cleanliness, with a view to the preservation of a healthy condition of the buccal cavity, it would seem best to advise the retention of the denture during sleep, as by so doing the wearer the more readily becomes accustomed to its use, and preserves unbroken the contour of the lips and cheeks, which it is one of the objects of artificial teeth to restore."

**CUTTING OFF ROOTS WITH SAWS.**—When a tooth is so broken that it is desirable to level down the remainder to the gum, there are several ways of doing this,—grinding, filing, and incising. If a saw could be arranged to do this work it would save time and some jar to the root. To provide a saw for this purpose has been an object with me, and the one here figured answers the purpose. It differs from the ordinary saws used in the mouth in having the blade so arranged that it can be revolved around the longitudinal axis of the instrument and fixed at any



angle. A cheaper form of blade-holder for amputating roots can be made by turning the ends of one of Dr. Clapp's saw-frames to an angle of ninety degrees. The frame figured is made to take saws of almost a fixed length, but to make it adjust itself to saws of varying lengths it is only necessary to continue one end of the gripping attachment through the handle and adjust the distance by means of a nut. This increases the cost of the instrument, and so the frame is figured in a simple form.—WILLIAM HERBERT ROLLINS, Boston, Mass.

**LOGAN CROWN HOLDER AND PIN PROTECTOR.**—In the process of grinding the neck of the Logan crown to adapt it to the root, one is apt to grind also the pin. To avoid this I place over the pin a tube like that of the nut-driver of Dr. How shown in the accompanying cut, which is taken from the DENTAL COSMOS illustration. The crown is held on the thumb with the forefinger over the end of the tube, which protects the pin from chance contact with the engine corundum wheel while the crown is being ground in the usual way.

—F. A. ROY, M.D., D.D.S., New York, N. Y.





**A BROKEN BROACH SEVEN YEARS IN A ROOT.**—The patient, a man of forty-five years, declined my proposal to crown two superior central roots, which, though considerably decayed, were in a comparatively healthy condition. They were extracted, and the somewhat darkened root of the left central was found to have protruding, about an eighth of an inch from its apex, the point of a broken broach. He said the teeth had been filled twelve years previously, and after five years, the fillings having come out, they were refilled by a dentist whom he visited several times during the progress of the operation. Since then the teeth had been slightly sore at times, but had given him no real trouble. There was a fistulous opening over the right central root, but none over the root containing the broach; nor was there, excepting the dark color of the root, any other abnormal appearance observable.—WILLIAM E. TRUEX, D.D.S., Freehold, N. J.

**ANTRAL SYRINGE.**—In the treatment of diseases of the antrum the syringe is an important adjunct, and should be especially adapted for antral uses.

The devices of Dr. J. N. Farrar, as described and shown in the *Missouri Journal* of September, 1879, page 485, are well designed for such purposes, although the function of the antral aspirator may be performed by an aspirating movement of the piston of the antral syringe. The spray nozzle is essential, and through the lateral perforations of its extremity will direct the spray upon all sides of the antral cavity for its cleansing or medication. The spray nozzle attached to a short, small rubber tube which is also coupled to the antral syringe nose, as suggested by Dr. Farrar, is the most convenient form of the device for either aspirating or inspiring the cavity of the antrum through the tooth-socket, canula, or other opening into the cavity.—H.

**CROWN DIE PLATE.**—Instead of the "hubs" made for use with the S. S. White Co.'s die plate, I use large buckshot, or round bullets. I take a piece of gold plate of a suitable size, lay it over the proper die, and placing on the center of the plate the ball-end of a plugger handle, strike it lightly with a mallet so as to make a slight dent in the plate. In this dent I place the lead bullet for a molar, or the large buckshot for a bicuspid crown, and with a heavy hammer pound the lead flat. By this method I avoid all danger of pounding the fingers, as will sometimes occur in holding the "hub" in place on the plate. The ready purchase of the shot or bullets saves the cost of the hub-mold and the trouble of casting the hubs. Lead, however, is too soft to produce the sharp definition of the cusps which the dies are capable of, and therefore either the hub-metal, or soft solder cast in a bullet-mold, will be found preferable to the buckshot or bullets. In this manner anyone may quickly strike up the crown cusps in smooth and beautiful distinctness of definition.—L. M. MATHEWS, Lawrence, Kansas.

**PULP-EXPOSURE.**—There are some cases where it is difficult to diagnose "Exposure of the Pulp." But there is one test that has *never* failed me. When I find the dentos sensitive at any point within the cavity of decay, then I am certain that the pulp is *not* exposed. The pulp may have only a thin, soft tissue over it, like a drum-head. Of course this must be left intact, though gently cleansed with broad instruments, water, alcohol, camphor spirits and creasote. No pressure should be made on this "drum-head" in placing the filling, for the filling can be condensed in every other direction, until the cavity is sufficiently filled to form a *solid* bridge over the pulp.—HENRY S. CHASE, St. Louis.

F. R. C., who inquires which is the best light for operating, will find a discussion of the subject in the *DENTAL COSMOS* for November, 1877, page 567; also in the number for January, 1889, pages 39-44 — W.

# A MONTHLY BIBLIOGRAPHY OF DENTAL LITERATURE.

COMPILED BY J. MELVIN LAMB, M.D., WASHINGTON, D. C.

THIS bibliography will be continued monthly in the DENTAL COSMOS, and will furnish as complete a record of dental literature as can be gleaned from current periodicals and transactions of societies.

While an effort will be made to keep the bibliography fully up to date, the reader will understand that foreign periodicals cannot always arrive in season to be indexed for the current month, as the journal must necessarily go to press at a definite date.

The abbreviations of titles used are those common to bibliographical work, and will, it is presumed, be readily comprehended by any one familiar with dental or scientific publications. Any explanation will be gladly furnished by the compiler.

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ORIGINAL COMMUNICATIONS.

RESTORATION OF ABRADED TEETH.

BY RODRIGUES OTTOLENGUI, M.D.S., NEW YORK, N. Y.

PERHAPS there are few conditions presented to the dentist for attention which are more appalling, from the magnitude of the repair required, than when a patient offers two jaws in which every tooth has been worn away one-half or more. Generally in such mouths but few if any teeth have been lost, and those present, though worn till their characteristic forms have been almost totally destroyed, are often alive, some even sensitive; indeed, it is usually the sensitiveness of one or two of the teeth which at last compels their owner to take cognizance of the wholesale devastation which is in progress.

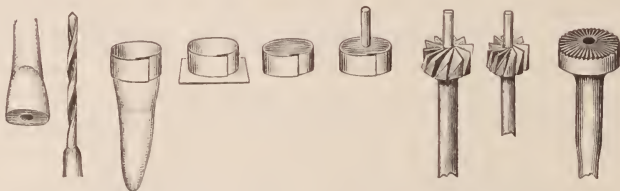
What then can be done? Building such teeth up with gold is too formidable an undertaking. Not one man in a hundred would do such work, expecting to see it intact five years later, for it must be remembered that one who wears out the natural organs in this manner brings the jaws together during mastication (or sleep) with more than ordinary force. To the solving of this problem Dr. F. T. Van Woert and myself have devoted ourselves during the past year. The result of our joint labors forms the substance of this paper, Dr. Van Woert having devised a new method of contouring the anterior teeth, and a suggestion of mine having led to a second novel method, applicable to molars and bicuspid.

In reconstructing an occlusion after our methods, it will be best to begin by building up the molar region, as the entire work could seldom be done at one sitting, and the posterior teeth would better support the partially restored occlusion. I will, however, describe Dr. Van Woert's method first, as being the more valuable addition to our dental resources.

The tooth to be operated on is usually found in one of three con-

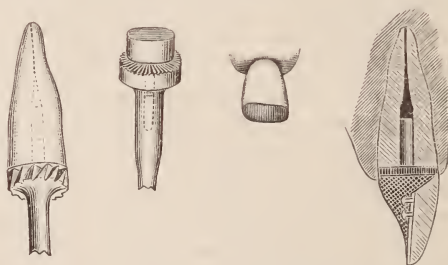
ditions,—pulp dead, pulp alive, or pulp partially calcified. If dead, we can readily make use of the canal; if calcified, a hole may be drilled for the reception of the pin, without going deep enough to disturb that portion of the pulp which remains responsive. In either of these two instances the hole is drilled with a twist drill of a given size (Fig. 1). A band of thin platinum is wrapped around the tooth (Fig. 2), thus forming a matrix approximating the circumferential form of the crown, and of a depth equal to the length of the

FIG. 1. FIG. 2. FIG. 3. FIG. 4. FIG. 5. FIG. 6. FIG. 7.



desired tip. A piece of platinum plate is laid on a soldering pad, and this matrix or band placed on it standing upright (Fig. 3). Gold plate, 24 k., cut in small pieces, is fed into this matrix, and kept at a melting point with the blow-pipe. A solid gold tip is thus formed, having a surface of platinum, and concave at the exposed end, because of the molten gold having assumed such form in cooling (Fig. 4). This concavity is useful when attaching the pin, making it more easy to find the center. A tiny piece of solder is dropped into it, and as it flows the end of the pin is pressed into place

FIG. 8. FIG. 9. FIG. 10. FIG. 11.



(Fig. 5). For making a perfect union between this cast gold tip and the tooth, Dr. Van Woert devised special facers, male (Fig. 6) and female (Fig. 7). The tit on the male facer corresponds with the diameter of the hole drilled in the tooth, and therefore faces the tooth end perfectly square (Fig. 8). The pin soldered to the gold tip is of similar size, and the female facer has a hole in its center exactly adapted to it. Then the pin of the tip is passed into the hole of the female facer (Fig. 9), and the tip is squared to match

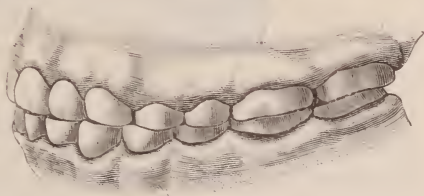


the faced end of the tooth, making a mechanically perfect joint. The next step is to remove the platinum from the surface with corundums, to shape and polish (Fig. 10). In some cases the platinum may be allowed to remain when a color less conspicuous than gold is desired.

This method affords opportunity for making a perfectly-fitting porcelain-faced crown in cases where the root has been destroyed below the gum-margin. Its uses in the construction of removable bridge-pieces will also be manifest. An illustration of such a crown is shown in Fig. 11. The root is faced and the tip made as described. Next, a tooth is backed, ground to fit, and waxed into position. After investment the two are united. If pure gold has been used for the tip, it may be soldered to the crown with a high grade of gold, thus producing a more durable result as to color. For removable bridge-work, the roots to be used as abutments may be crowned with tips, and the bridge constructed with bands.

Those who have endeavored to fill with copper amalgam, veneering with one of the so-called "white" alloys, have reported failure. This is because the two amalgams placed in juxtaposition in a plastic condition do not thoroughly amalgamate. Nevertheless, I have discovered a way of forcing a union strong enough for contouring molars. The teeth to be restored are built up with wax on a plas-

FIG. 12.

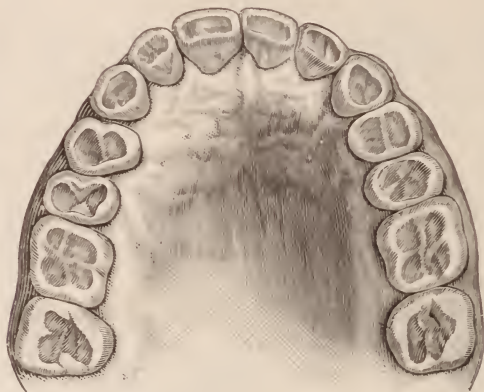


ter model, and an impression of each taken with plaster. When this has hardened, the wax is removed and the plaster impression filled with amalgam. Copper amalgam may be used, but if it is desired to have a good color, one of the "white" alloys may be chosen. While still plastic, two or three platinum pins (from old porcelain teeth) are pressed into the mass. By the following day the amalgam crown, exactly suitable for the desired contour, may be removed from the plaster impression and polished. The surface of the tooth in the mouth is ground square, and several screws of platinum and iridium placed in tapped holes. The under side of the amalgam crown is roughened, care being taken not to dislodge the pins. All being in readiness, it remains only to unite the crown and tooth. It was just at this point that Dr. Van Woert rescued me when repeated failures had made me inclined to abandon the project as impracticable. My idea was to use copper amalgam for the union. I tried this in several cases, but my patients came back with the crowns in their hands (one patient refused to return at all).



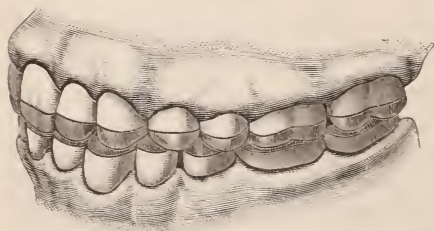
Meanwhile Dr. Van Woert had visited Newark and taken some lessons from Dr. Osmun. When I dolefully told my tale of failure, he showed me a patient in whose mouth he had succeeded. The secret is that the amalgam must set hard before the patient is allowed to leave the office. This may be accomplished in about fifteen minutes if the amalgam be manipulated in the hand to make it quick-setting, as described by Dr. Osmun, from whose paper on copper amalgam I quote:

FIG. 13.



"In nearly all cases too much *lamp-heat* is used; the material is held in the flame *entirely* too long. It *never* should be held in the flame until the edges of the block of amalgam turn brown or blue; it should be held first in the flame and raised as it heats, until you see minute particles of mercury appear on its surface; then it should be thoroughly crushed in the mortar, then *rubbed* briskly in

FIG. 14.



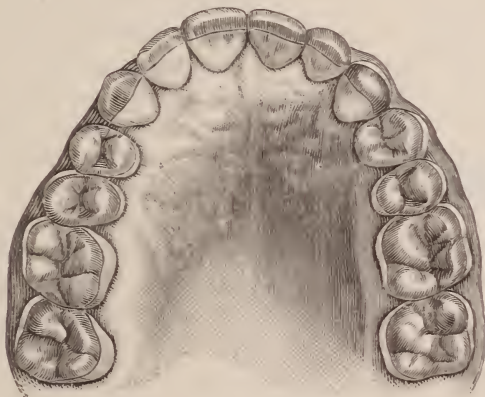
order to get heat by *friction*: when this has been done well you will have a fine powder, which turn into the palm of the hand and by the animal heat and its further manipulation you have a plastic mass in a very short time. The *great secret* in the use of the copper amalgam is to get an extremely

soft, pulpy mass, and yet to have it *set quickly*. Copper amalgam should never be used in a *dry, granular form*, but in a wet, soft mass; and if it is properly handled, it will set sufficiently hard in from three to five minutes."

Thus beautiful amalgam contours are possible, practicable, and

durable. Thus solid contours of amalgam or gold may be made with little if any pain to the patient. The only weak point in our method is in the third class of teeth,—anterior teeth with living pulps. We have not given up this problem yet, and hope to conquer it. In the interim, if it is deemed best not to destroy the pulp in order to give place for the pin, such a tooth may be contoured with gold in the ordinary way, the other solid work serving as a

FIG. 15.



protection; or it may be built up with consecutive layers of gold plate screwed to one another and to the tooth.

Figs. 12, 13, 14, and 15 illustrate the possibilities of this work.

Fig. 12 is from the articulated model of a case in which the twenty-four teeth had been abraded by masticatory action to the extent shown in the figure, and made more obvious by Fig. 13. The restoration was by Dr. Van Woert's method with solid gold tips for the oral teeth (Fig. 14), and by my method with amalgam tips for the molars (Fig. 15).

## COMPULSORY ERUPTION OF THE TEETH.

BY EUGENE S. TALBOT, M.D., D D.S., CHICAGO, ILL.

Of all the forms of irregularities of the teeth, none are more difficult of correction than those which remain partially or wholly imbedded in the jaw. The teeth most liable to such derangements are the cuspids and second bicuspid; the reason for this is readily understood when we recall the manner and order of the development of the teeth. I have observed, however, the molar, the first bicuspid, and even the incisor also to be tardy in eruption. These conditions are nearly always due to local causes. The object of this series of three short papers is to describe simple and easy methods

of regulating by compelling the eruption of these teeth. Fig. 1 illustrates the right superior lateral arch of a boy eighteen years of age. He has been a patient of mine from the first. At about the tenth year I was able to indicate in outline the crown and root of the cuspid, and noticed the marked obliquity of its position. The posterior column was crowding the bicuspid forward so that they eventually filled the space allotted to the cuspid. The teeth in the left superior lateral arch came into position in the natural order, and

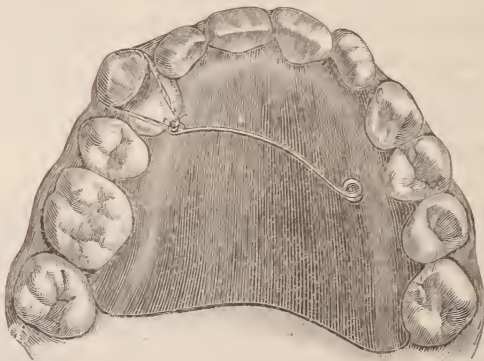
FIG. 1.



that arch was nearly normal. In the treatment of this case I waited until the point of the cuspid made its appearance, when I extracted the first bicuspid. Platinum bands were fitted to the second bicuspid and lateral incisor, and these were connected with a bar of

platinum extending to and impinging upon the central incisor. A flat tube was then soldered to the bar for the purpose of securing a coiled spring, made of the smallest size piano-wire, the arms being cut to about the same length. One arm was doubled upon itself and so adjusted that when it was passed into the flat tube the suitably bent end of the other arm would reach forward and catch upon the point of the cuspid. By this means the cuspid was swung backward and pulled downward until the crown was in a direct line

FIG. 2.



with the position it was to occupy when in place. An impression was then taken and a vulcanite plate made (Fig. 2), in which another spring of piano-wire was inserted in such a manner that when properly adjusted the end of the arm reached over and just inside of the space of the cuspid. A ligature was then tied around the neck of the tooth, and the arm of the spring drawn close to the crown and



fastened. By glancing at Fig. 2 it will be observed that the action of the spring must be to draw the tooth not only down, but also inward to its position. In locating the spring in the plate, the position of the crown before and after it is brought into place must not be lost sight of. When the spring is applied for the purpose of drawing the tooth out of the alveolar process, the patient must be seen every day, because in most cases this movement is so easily accomplished that only twenty-four hours are necessary to complete the operation. If, on the other hand, two or more days supervene before the patient is seen, the tooth would be erupted further than is required. I have observed such cases. Teeth wholly imbedded in the jaw may be erupted with a spring, as shown in Fig. 2, by first removing a piece of mucous membrane and alveolar process over the crown with Rollins's revolving knife. The advantages of this peculiar kind of spring in these difficult cases are—1st, it can be adjusted to any special angle required; and 2d, the force is constant and need not be readjusted for three or four days after it is applied (if the movement is not rapid), thus relieving the operator and patient from the expenditure of time in frequent office attendance.

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## PROCEEDINGS OF DENTAL SOCIETIES.

### NEW YORK ODONTOLOGICAL SOCIETY.

THE New York Odontological Society held its regular meeting Tuesday evening, January 15, 1889, in the parlors of the New York Academy of Medicine, No. 12 West Thirty-first street. The president, Dr. J. Morgan Howe, in the chair.

#### INCIDENTS OF OFFICE PRACTICE.

Dr. George E. Rice. Many have been annoyed by the constant slipping of the driving-belt on a dental engine when used with much power. I have discovered by experiment a very simple way to prevent slipping of the belt entirely. It is by the application of resin. It may be applied to the belt as a powder, or, better, by holding a piece of common resin in contact with the belt while the engine is running. The resin promotes friction between the belt and wheels in such a way as to make it possible to drive the engine with great force, allowing at the same time the use of a very loose belt, and with no perceptible slipping. It can be used on belts of any material, and it seems to me that this simple device will be found fully as efficient as the patent rubber rims that are sold for the purpose.

The President. Gentlemen are requested to present any instruments they may have for excising overhanging gum-tissue, especially



from lower wisdom-teeth. Dr. Abbott, did you bring the instruments you have for this purpose?

Dr. Abbott. Yes, sir; I have two of them, of different kinds. Some five or six years ago a physician who was in my office said to me, "Why don't you invent an instrument for clipping off bits of gum lying over the wisdom-teeth in the lower jaw, where it is so frequently an annoyance and a source of great pain to patients? We surgeons have nothing but the common surgeon's scissors, and often make a bungling piece of work in attempting to remove it." In considering the matter, I thought it a simple thing to do; so I made some drawings and took them to Mr. Ford, at Hazard & Hazard's, under the Fifth Avenue Hotel, and they made this instrument. The first one I had made was designed to have the blade cut all around, at once, through the gum. I found that was too painful to the patient, and I then devised this instrument, which cuts at one point in the center, and then cuts each way, like a scissors; the blade that runs under the gum shutting directly inside of the cutting-blade proper, making a sharp cut between the two. It works very well indeed. The only disadvantage about it is that occasionally the under blade will be found to be a little too thick and large. Our president has recently had one made after this pattern, but a size smaller, and probably he can use it in more cases than this can be used, and it will remove all the gum necessary.

I have another instrument here that some gentleman made me a present of two or three years ago; and if he should happen to see this statement I hope he will be kind enough to let me know who he is, for I am sorry to say I have forgotten his name. I wish him to have credit for the invention. It is a circular knife to run in the engine, curved toward the handle. It strikes the gum, revolving rapidly, and cuts it off very quickly. The only difficulty with it is that when the gum fits into a depression in the crown of a tooth it is not so easy to reach it with this knife as with an instrument that runs under the gum. This will work very nicely when the gum does not lie down tightly upon the tooth. It requires no pressure at all; consequently causes much less pain than the "punch" instruments.

Dr. J. P. Geran. I have here the pattern of a rude instrument for excising gum-tissue which I devised about twelve years ago, and which any dentist can make by filing up a piece of steel and making a barrel to fit a central forceps. In moving, two years ago, I lost the original instrument, and have never had one since. I made this pattern the other day, and I thought it would not be out of place to show it at this time.

Dr. C. E. Francis. I here present a gum-excising forceps which

was devised by Dr. A. P. Merrill, formerly of Chicago, and now residing in California. It is a very small and delicate instrument, and the most valuable one for clipping out a piece of flesh overhanging a third molar that I have ever seen. It works charmingly. I now have two; one made in Chicago, and a duplicate of it made for me by The S. S. White Dental Manufacturing Company. It is necessary to be somewhat expert in the use of this instrument, as the pressure should be suddenly applied. It will clip off a piece of flesh as quick as a flash.

President Howe. Some months ago, being in need of an instrument for this purpose, I ascertained that much complaint had been made of the inefficiency of those heretofore manufactured, and learning incidentally that Dr. Abbott had devised an excising instrument, I called on him. He kindly loaned me his instrument, and also gave me the privilege of having a duplicate made. This that I show now has blades much smaller and thinner than his, although it is an exact copy of his idea,—but an improvement on it I think,—having the blades so shaped as to cut like scissors and not like a simple punch. This instrument shown by Dr. Francis appears to cut all around at the same time, and the one suggested by Dr. Geran is to the same effect, a circular punch coming down on a disk of metal. I have found this pattern of Dr. Abbott's very efficient; however, there was one difficulty about its use, and that was in elevating the handle to get the point of the under blade below the flap of gum as far as the posterior edge, or sometimes a little beyond the posterior edge of the lower third molar, the point of the upper blade would often engage some of the soft tissues covering the ramus of the jaw, or else in the effort to escape this, the flap would not be as completely removed as was desirable. On that account I have had made a pair of curved scissors with blades so thin that the point of one of them can be slipped under the gum flap very readily, and the excision be more thoroughly and painlessly performed. The Abbott instrument I had made at Hazard & Hazard's. This pair of scissors was made for me by Rynders & Co., corner of Twenty-third street and Fourth avenue, and I find them very efficient.

Dr. A. H. Brockway. I have never found any difficulty in excising the gum in these cases with a pair of curved scissors, the blades of which have little protecting knobs on the point to prevent them from catching into the tissues. The operation is very simple. I first obtund the sensibility of the part to be cut off by a momentary application of Von Bonhorst's preparation, then grasping the free edge of the gum with a pair of Bogue's pliers,—which, as you know, lock with a spring catch when closed,—I allow my

assistant to hold them and draw the gum a little up, when, with usually one motion of the scissors, I clip off the superfluous gum with very little trouble or pain.

President Howe. The blades of the scissors presented by myself are made delicate for the purpose of slipping behind the tooth and under the flap of the gum. If they had knobs on, the knobs would interfere with that.

Dr. Brockway. The knob is very slight, not larger than one-half of a small pin head.

Dr. Francis. I have used an instrument somewhat similar to the curved scissors exhibited by Dr. Howe, but could not rely upon them. A young lady came to my office to-day who has an inferior third molar struggling to get through the gum, and but a small portion of the tooth visible. Her face was much swelled, and she was suffering severe pain. I pressed my finger against the gum and discovered pus exuding. First making an application of cocaine to the gum I, a few minutes later, clipped out a piece of the flesh directly over the tooth, with the little instrument which I have already presented. It was done in an instant. The forceps has been in my possession for about two years, during which time I have used it in many cases, and every time it has worked perfectly, so I can wish for nothing better for the purpose.

Dr. Allan. My scissors, made some seven or eight years ago by Ford, of Caswell & Hazard's, from patterns designed and furnished by myself, are practically the same as those our president has presented, except that he has made the blade thinner at the top. Mine has a little more strength, and no spring to it. I have not found any difficulty in excising the gum around wisdom-teeth with these scissors. Sometimes I have used a right-angle lancet, which works very well when sharp enough, but unless it has a very sharp and keen edge it is apt to push the gum, and it is then difficult to cut at just the point desired.

But I think that in the near future we will discard all these cutting instruments, and instead of them use the actual cautery. There is no question whatever but that with platinum points, heated to a red heat by a current of electricity, all these cases can be managed with a great deal more ease and certainty than with any cutting points. It is only a question of time when we will have our offices supplied with a current in some practical shape, and then every operation of that kind will be performed by the actual cautery. I have not the slightest doubt that it will supersede every other means, and for one very great reason: not only is the cautery used with great precision and ease, but there is no hemorrhage following the operation; the parts can be touched at any point, cut as deeply or slightly as de-



sired, and there is seldom any inflammation or ill effects afterwards.

Dr. Littig. I have an instrument for excising the gum made by Ash & Sons, but unfortunately I have not brought it with me as I intended to do. It is made very much on the same principle as Dr. Abbott's, only that the top is open and shuts into a ring. The shape of the instrument permits it to run under the gum easily; it cuts readily, and gives little if any pain. I have used it quite a number of times, with a great deal of satisfaction to myself and my patients.

Dr. V. H. Jackson. I would like to ask, without reference to the practicability of these instruments, whether it is better to put the lance into a seriously inflamed gum, even though the mouth be fully closed, or to first reduce the inflammation. It is not my practice to always begin with cutting. I usually use a saturated solution of tincture of iodine, forcing it well under the gum around the tooth, for the purpose of reducing the inflammation, which is easily done in the course of one or two days by one or more applications. I then do the cutting, when there is not so much inflammation and soreness. The appliances that have been shown certainly represent a great deal of ingenuity, and are very practical and useful. I have used a pair of ordinary curved surgical scissors for the purpose thus far.

Dr. Francis. In reply to the last speaker, I would say that patients sometimes come to us in great agony, as did the lady who came to me to-day. They have already suffered as much as they can well bear, and wish relief as soon as possible. I prefer to do the cutting at once and make my applications afterwards, which will then have a quicker and better effect.

While I am on the floor, permit me to call the attention of the members of this society to the *International Dental Journal*, formerly the *Independent Practitioner*. I think there are but two or three members of the Odontological Society who are not already its subscribers. I wish every member would not only take it, but would also secure as many subscribers as possible. It costs only a fractional part of a cent a day for a journal, and about one and a half cents a day will pay for the two best dental journals published. This is certainly but a trifle. We pay several times as much for car fares, newspapers, etc., daily without missing the small amounts. It will pay any dentist well to subscribe for this journal.

The President. Gentlemen, we have with us this evening Dr. Robert Ormiston, of Brooklyn, who will present to us a subject that he has especially prepared for our consideration. I have the pleasure of presenting Dr. Ormiston, gentlemen.



Robert Ormiston, M.D., here read a paper entitled

THE NEW EPOCH IN MEDICINE.

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A theory is a succinct and comprehensive statement of the underlying principles that pervade phenomena. A theory indicates the mental altitude of the age. It is a focus of the time. It sums up the character of a period. Without a theory, knowledge remains disjointed and chaotic; facts seem unrelated. A theory brings order out of confusion; facts arrange themselves like an army into companies, regiments, and divisions. Everything is put where it belongs, and the whole is a splendid achievement. We know those early Greeks by their theories. We know by their theories how meager were their facts. They failed not in intellectual grasp, but in *facts*. Even Aristotle, who had collected more facts than any man of his time, could not resist the temptation of constructing the universe in theory before he had laid its foundations in truth. Notwithstanding their failures, we owe these great minds an untold debt of gratitude. We owe to them the methods by which to succeed.

Aristotle, the father of logic, by the triumphant use of the inductive and deductive methods of research bequeathed to posterity the keys of nature. He whispered into the dull ear of the world the "Open Sesame" to the treasures of science. This was the seed-time of our harvest. Every day the world is richer and better because of exact methods of research and reason.

Our own age has formulated four great theories, commensurate with its vast accumulation of facts,—the theory of evolution, the theory of the conservation and correlation of force, the theory of the origin of species, and the germ theory of disease. The germ theory, whatever may be its outcome, is important enough to have produced an epoch in the history of medicine. It has dictated the course of investigation and has revolutionized therapeutics. Surgery within the last fifteen years has become a new art. It has demonstrated the possibility of arresting septic fermentation in wounds, and the capacity of all wounds to heal without suppuration. What are the conditions of septic fermentation? Three,—moisture, warmth, and microbes. Absence of anyone of these conditions is sufficient to prevent decomposition. Under the old régime a surgical wound was a constant invitation to floating germs to set up in business, generating pus, producing the poisonous ptomaines through pathogenic fermentation. Then follow local changes: inflammatory action begins, systemic disturbance known as septic fever sets in, not unfrequently followed by death. The modern treatment of wounds ends all this,—no fever, no formation of pus; a bland and healthy union

of the approximate tissues occurs. This treatment is based entirely on the well-known principles which have long been applied to the preservation of organic substances. Aseptic surgery consists in the intelligent use of exsiccation or drying, the actual cautery, and chemical sterilization by germicides; also the combination of chemical sterilization with exsiccation. Modern surgical methods are succinctly expressed in the term *Listerism*. Listerism does not merely mean carbolic acid spray; it means any method of excluding and killing such germs as are liable to set up suppurative fermentation in wounds or in any way hinder reparative action. The aseptic form of treatment is that which preserves a clean wound from septic infection. It is purely preventive. It has been demonstrated that a dustless operating-room renders all other precautions unnecessary. Antiseptic treatment is to prevent the further extension of existing trouble. One method prevents the fire, the other extinguishes it. The literature of medicine is filled with triumphal records of aseptic and antiseptic surgery. The difficult has become easy, that which was dreaded is sought, the impossible is proposed, and the future is all aglow. Who now dreads a compound fracture of the thigh? To-day joints are freely exposed to the atmosphere, offending bacilli vigorously expunged, the cavities filled with an antiseptic solution and closed up with the assurance that there will be no suppurative inflammation.

Perhaps nothing in modern surgery has shown its marvelous progress more than its achievements in laparotomy. It was the *bête noir* of our predecessors. It came through the valley and shadow of death to stand at last upon the hill-tops of life. It was not peritonitis that was to be feared; it was microbes and *débris*. A story is told of Mr. Tait, the great laparotomist. Some time ago he was called upon by a celebrated German surgeon, who inquired the secret of his remarkable surgical success. Mr. Tait looked at his German visitor's hands and hesitated at first to answer. Finally he said, "It is because I give the greatest attention to the care of my nails." The German glanced at his hands, and turned away never to return.

Thoroughly cleanse the peritoneal cavity and exclude infection, and a favorable result is almost certain to follow. If one kidney offends and threatens life, the surgeon removes it. If disease obstructs the bowels, he cuts it out and unites the healthy ends, and life is saved. He does not even hesitate to extirpate an unruly spleen. A surgeon can do almost anything he chooses if he conforms to aseptic and antiseptic methods. The steps of a surgical operation are as carefully attended to as if it were a chemical experiment. All the instruments are waiting in trays containing a solution of carbolic acid. The ligatures are boiled in antiseptic fluid, in which they

remain until wanted. All bandages, sponges, and dressings are made thoroughly antiseptic. The hands of all those engaged in the operation are disinfected, and from time to time dipped in a carbolic solution. The part to be operated on is carefully washed and shaved; it is surrounded by cloths saturated by some disinfectant solution. The knife of the surgeon is followed by a stream of antiseptic liquid. At the completion of the operation the wound is closed, with every careful detail attended to to make the cut surfaces inaccessible to micro-organisms. This gives you but a faint idea of the scrupulous care necessary. The result is beyond all that the old surgery dreamt of. When one thinks of the surgeon of to-day, it is almost incredible that not more than one hundred and fifty years ago he was found in a barber's shop.

You, gentlemen, belong to the grand army of surgeons. You are engaged in the treatment of lesions more or less surgical. You are in fact medical specialists as much as the oculist, aurist, or orthopedist. I am aware that the intellect of your own department of the healing art is quite abreast of the time in the new thought. But do dentists in every-day practice carry out what they know of aseptic and antiseptic methods? When you think what a forest of bacterial algæ the mouth is, and that many of them are pathogenic, it does not seem possible to lay too much stress on this point. Dr. Sternberg found that in his own saliva there are always enough of what he calls the *Micrococcus Pasteuri*, when injected into a rabbit, to kill it in forty-eight hours. This particular coccus is now attracting large attention, and may turn out to be the coccus in pneumonia. The condition of the mouth and the character of the bacteria found there will in the near future play a most important rôle in therapeutics. The bacteria of the mouth, besides being pathogenic and benign, are also in a very important degree physiological. We are now anxiously waiting to know just what their functions are in digestion and assimilation. Quite recently Pasteur has isolated as many as seventeen micro-organisms in the mouth which survive the action of the gastric juice; of this number some dissolved albumen, gluten, and casein, and some transformed starch into sugar. From the present indications, the fermentative change they produce in food is a most important feature in digestion. This subject will enlarge the scope of scientific dentistry, and furnish a new field for thought and investigation. We may yet go to the dentist to assist our digestion as well as our trituration.

Let us for a few moments consider these organisms that have of late become so prominent in all medical literature, and which follow us for good or evil from the cradle to the grave. From a morphological point of view they are most insignificant. They are not dis-



tinguishable separately by the unaided vision, but in mass they appear quite characteristic in color and arrangement. Their structure is of the lowest kind, having no differentiated organs. They appear to be nothing but very minute filaments of living protoplasm having a delicate covering of cellulose. These minute forms, after much consideration, have been placed in the vegetable kingdom with the genus *algæ* or seaweed. The various species differ greatly in size, but may be said to average about one-ten-thousandth of an inch in length. Those which are round dots are commonly called cocci. They are very minute, not more than one-twenty-five-thousandth of an inch in diameter. Those which have a rod-like form and produce spores are called bacilli, the name bacterium being confined to those species in which the spore formation does not exist. On account of the uncertainty in regard to the existence of spore-production in the Schizomycetes, the limit of the genus *Bacterium* is very uncertain, hence it has been proposed to abandon the term altogether and include all the rod-forms under *Bacilli*. The rods when twisted on themselves are called spirilli.

Many bacteria are capable of free movements in fluids, rotating on their longitudinal axes, oscillating forwards and backwards, and conducting themselves as if they possessed organs of motion. That they possess such organs of motion is more than doubtful. What sometimes appear to be such are really thread-like extensions of the soft gelatinous membrane-layers. Bacteria multiply with astonishing rapidity,—under favorable conditions as often as once an hour. The individual cell first elongates until it becomes double its original length; after a short period of repose the cell becomes constricted in the center; at first only the contents but at last the whole cell is divided. Thus it goes on continually. Another method characteristic of bacilli is the formation of spores which form within the cell and escape when the cell-wall is broken up. These spores have a much more pronounced vitality than the cells themselves. They are very difficult to destroy, resisting extremes of temperature and the action of acids and alkalies.

To the physiologist bacteria are subjects of extreme interest. When one thinks of their astonishing power of changing the whole character of the environment in which they multiply, the occult manner in which they produce the deadly ptomaines, the mysterious character of fermentation which is in numerous instances produced by them, one is profoundly impressed. Such, for example, as the souring of milk or lactic fermentation, the ammoniacal fermentation, the butyric fermentation, the vinous fermentation, the spoiling of meat, fish, and other nitrogenous substances. In fact, all putrefaction is the result of the ceaseless activity of these countless



organisms. When we examine bacteria as pathologists we reach the climax of wonder and dread; we are face to face with the destroyers of the race. Wars, famine, and nature's most dire cataclysms are nothing when compared with the activities of the pathogenic forms of these organisms. All bacteria are not pathogenic; their great work for good is in the capacity of scavengers. They return the elements of organization back to their original source with renewed activities for fresher and higher combinations. The bacteria have been classified according to their habitat in living or dead organisms, so we call them parasites and saprophytes. They are also classed ærobic and anærobic, according as they do or do not require free oxygen for their support. As dentists you are interested in the anærobie saprophytes. To these classes belong the bacteria which produce dental caries.

Here let me say that your *confrère*, Dr. Miller, of Berlin, who I am proud to say is an American, has the honor of establishing the germ theory of dental caries on a sound experimental basis. The dental mind traversed many a sea of theory before it entered the haven of truth. You will all remember the vital or inflammatory theory by Boudet and Jourdain as far back as 1754 to 1766, the chemical theory by Robertson, the *mineral* acid theory of Dr. Watt, of Ohio. Dr. Magitot, of Paris, had an *organic* acid theory produced by fermentation. Monsieur Désirabode opposed all chemical theories on the ground that caries often began in the pulp-chamber and therefore could not have been caused by the action of acids. Then the fermentative or putrefactive theory, another kind of chemical theory. After this Liebig's molecular-motion theory, which was spoiled by the discovery of the yeast-plant in 1838 by Schwann; and now we have the parasitic, germ, or septic theory. This entirely accounted for dental caries by the action of micro-organisms, but did not explain how these organisms were able to penetrate the sound enamel. Dr. John Tomes in 1859 advanced a new theory, the chemico-vital, which is fully explained in the first edition of his work on dental surgery. As late as 1868 we have the most impossible of all theories, the electro-chemical of Bridgman. The crown of the tooth, according to this theory, becomes the positive electrode, the surrounding tissues the negative; all that is now required to produce dental caries is to have the secretions of the mouth become abnormally acid, and the galvanic processes end in caries. Now we have reached the last, which is termed the chemico-parasitic. The attack to produce dental caries is made by three divisions of micro-organisms: First, those which transform the starches and unfermentable sugar into fermentable sugar; the second changes the fermentable sugar into lactic acid; the third institutes a digestive fermentation. If the

normal secretions of the mouth do not neutralize the effects of the acid-generators, in some sequestered spot in the dental array where food has lodged will begin the delicate operation of decalcification of the enamel. Then the door is quietly opened to the dentine, and in rush the waiting micrococci, one-fifty-thousandth of an inch in diameter. The dental tubuli are broad avenues to these swarming freebooters. Within the tubuli the process of decalcification continues until no lime-salts are left. The third division finishes the work of destruction, and nothing is left but the pulpy putrescent tooth-cartilage.

Koch has propounded four laws of verification in the investigation of parasitic pathogenic organisms :

"1. The micro-organisms must be found in the blood, lymph, or diseased tissues of the man or animal suffering from or dead of the disease.

"2. The micro-organisms thus obtained must be isolated and cultivated in suitable media,—that is, outside the animal body. These pure cultivations must be carried on through successive generations of the organism.

"3. A pure cultivation thus obtained must, when introduced into the body of the healthy animal, produce the disease in question.

"4. In the inoculated animal the same micro-organism must again be found."

Dr. Miller has triumphantly submitted to the discipline of these rules, as all of you know who have read his published papers. He determined first that the acid-forming ferment in the mouth was capable of self-reproduction, and must therefore be of organic origin, and not, as in the case of ptyalin, an unorganized ferment. A second series of experiments demonstrated the fact that must be of great interest to the dentist,—that the organisms producing dental caries do not require oxygen in order to live and thrive. They are just as happy deep down in the bottom of a tooth as in any other place. They go on just as industriously with the lactic acid business as if they were in a more salubrious region. They belong to the anærobic division.

The third series of experiments consisted, first, in producing a pure culture of the bacteria of dental caries by the usual method of bacteriologists. The seed material was taken by a sterilized point from the deepest part of a decaying tooth. A portion of the pure culture obtained was introduced into a tube containing a fermentable mixture; another portion was placed in a similar tube containing a non-fermentable mixture, both being sterilized. In each of these tubes were placed small sections of a sound, recently extracted bicuspid which had been sterilized. The first tube became acid in a few hours;

the sections of the sound tooth soon softened, and at the end of a week became pliable. At the end of two weeks all but the thicker sections were entirely decalcified and were easily cut with a knife. Sections were made by means of the microtome, which were stained and mounted for microscopic examination. The dental tubules were found to be distended, distorted, and broken down by the ravages of the micro-organisms, resulting in the formation of oval spaces just as you would find them in natural decay. In the second tube, containing the non-fermentable mixture, no change occurred.

Dr. Miller does not pretend to say that parasitic activity supplies all the conditions entering into dental caries. There are of course predisposing causes,—some inborn weakness of structure which, like all weakness, invites attack; an acid condition of the oral secretions, acid food, or medicine may give rise to caries in spots which otherwise might have escaped unharmed. Dr. Miller found micro-organisms in every one of a thousand slides of dental caries examined. Another fact which helps to sustain the chemico-parasitic theory is that when a tooth is decalcified by an acid void of fungi the dental tubuli are not changed in diameter, the softened dentine is not discolored, and putrefaction does not occur. To one who has no practical knowledge in your department, but who has gone over the literature of the subject, it would seem conclusive that the parasitic theory has been scientifically demonstrated by Dr. Miller and others who have given experimental attention to the subject.

The more intricate character of constitutional diseases, and the difficulty of producing a general effect profound enough to kill bacteria in the blood without at the same time killing the patient, has no doubt prevented the same sweeping revolution in medical therapeutics that we find in surgery. But even here the practical application of the theory of germs to disease is making progress. Many of the new and incoming medicines are antiseptic and germicidal in intent. Certain forms of indigestion produced by fermentative action are successfully treated by disinfectants. Diphtheria may be arrested by an early and vigorous use of disinfectant measures, and no doubt similar success has been obtained in consumption. It has been found that the best atmosphere for the consumptive is not the high nor the warm nor the cold, but the *aseptic*. I have mentioned that one of the prime conditions for the development of micro-organisms is moisture. For this reason a dry atmosphere becomes antiseptic,—it arrests germ-activity. This has led to the very recent method of treating consumption by inhalation of hot dry air. Of course any change, high or low, of the temperature optimum may be enough of itself to destroy the capacity for development of the tubercular bacteria. Dryness alone will do it without regard to



temperature. Quite a number of skin-diseases are known to be produced by micro-organisms and cured by germicides. Several diseases of inferior animals have been successfully produced by inoculation by pure culture of bacteria found in these diseases. This is also true of erysipelas, glanders, relapsing fever, and tuberculosis. In the case of typhoid fever, although a constant organism is found, no inferior animal has been discovered susceptible to the typhoid bacillus.

Although I have occupied more of your time than I contemplated when I began this paper, I feel that I have given you a much more imperfect presentation of the subject than I could have wished. It is evident that by the researches of bacteriologists we are entering a new era in the science and practice of medicine. How great the changes will be that shall come to pass by new investigations it is impossible to forecast. Much has been done, but much more remains to be done. We have not yet determined whether zymotic diseases are produced by the direct action of micro-organisms or by the indirect effect of products produced by their activity of growth and power to decompose the medium in which they flourish. The deadly ptomaines are produced in this way, and products yet unknown may be discovered, so that ultimately the subject may be carried into the domain of organic chemistry.

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The President. Gentlemen, you have heard this very interesting and delightful paper of Dr. Ormiston's, and the subject is now before you for discussion.

Dr. Perry. It seems to me that in having a scientific man we have almost lost a poet. I do not know whether the spirit of the paper is more sweet and lovely than it is wise; but certainly I am in accord with all that is said in it, with my little knowledge of the subject. I think there are several practical applications of the teachings of the paper which can be made in our specialty; as in the treatment of exposed pulps, in the treatment of the roots of pulpless teeth, and in the care of our dental instruments. Perhaps some of you gentlemen may remember that a number of years ago I ventured to advocate the application of the germ theory in the treatment of roots of pulpless teeth and the troubles that arise therefrom. I mentioned that in my belief the source of troubles of that kind is not to be found in the pulp-chamber alone, but also in the substance of the dentine itself. Of course we know that the fashion heretofore has been to direct the entire treatment to the pulp-canal; it was believed that if this was thoroughly cleansed and purified, everything was done that could be. It seems to me that we have not done all that should be expected, because there are

innumerable little canals or tubuli opening into the pulp-chamber which require and should receive antiseptic treatment also; and if by means of hot air those little tubuli can be dried a little and placed in a condition to receive such disinfectants or antiseptic remedies as may be used, it seems to me that that is one good point gained,—if the theory of the paper be correct. I think it is an error to assume that if we cap a pulp once and trouble arises from it, that is all that can be done with it. I have capped the same pulp three or four times, and at last succeeded in saving it; and I believe my final success was due to the fact that at last I had rendered not only the surface of the exposed pulp but the surrounding dentine itself aseptic. I had finally produced such a quiet, undisturbed condition of the tissues that nature reasserted herself and was able to raise the pulp from its feeble condition to a higher and more healthy state. The pulp was kept alive; and I suppose it is admitted that a living pulp is the best filling that a tooth-root can have. And if this theory be true there is no question but that a great gain can be made by thoroughly drying the cavities as a precedent to the use of antiseptic remedies.

There is another point in connection with this theory which it would be well for members of our specialty to remember, and that is that contagious diseases are believed to be propagated by germs. In view of this fact I have standing in a corner of my washstand a large bottle of bichloride of mercury, and my instruments are never used upon different patients, if they have been used upon the tissues of the flesh, until they have been cleansed and dipped in a solution of bichloride of mercury and dried. This care is not always taken with pluggers and other instruments used only upon the dentine and enamel, but my excavators and all instruments that have been used upon the soft tissues are so treated before being used again. I need not say that this is done for the purpose of disinfecting them. I believe in the theory propounded in the paper, and I am not willing to take the risk of the transmission of disease from one patient to another by using in different mouths instruments that have not been cleansed and disinfected. As to the care of the hands and the nails, I think it is impossible to express too strongly the importance of this esthetic feeling of cleanliness.

There is no doubt in my mind that the theory put forth in the paper to-night is true in almost every particular. It seems to me that it must, in the very nature of the case, be true. I would perhaps take a slight exception to the idea suggested in the first part of the paper, that the germ theory is accountable for the decay of teeth. I should say that it was *one* of the factors, and, as the essayist said also a little later, the *principal* factor in that decay. There is not a

shadow of doubt in my mind but that Dr. Miller is on the right track, and that we have waited all these years for a final and satisfactory explanation of the cause of the decay of the teeth.

President Howe. Dr. Ormiston's paper has very much of interest in it for us, and certainly the weight of evidence is very largely on the side of a germ cause for almost all the ills that we as dentists know. There has at times, however, seemed to me to be questions arising out of the facts of practice that are difficult to reconcile with this theory. I am quite aware that there may be apparently irreconcilable facts, and a theory still be true; but such facts may as well be kept in mind, to at least suggest that our natural tendency to accept conclusions too eagerly may well be held in check by the cultivation of judicial caution. If aseptic conditions will prevent dental decay, and copper amalgam is as actively antiseptic as reported by Dr. Miller, then it would seem decay should never recur at the margins of fillings made of this material, but I have seen such decay repeatedly. I hope we will all watch for these points in the use of this material. It has been my practice for years, after removing the decayed dentine from cavities in children's teeth as well as I could,—and that often was very imperfectly,—to pack them with tin foil, especially in the smaller grinding-surface cavities, without any attempt to make them dry, or if there was any such attempt it was usually a failure; and yet such fillings in such imperfectly prepared cavities have almost always been efficient for the purpose for which they were made. So the query has come to my mind, and it recurs to-night, as to how this result is to be reconciled with the septic theory of dental decay. And again I recall the fact that iodoform has been a very useful agent for a long time in the dressing of wounds and in its application to the assumed septic conditions of the canals of pulpless teeth. Owing to the good effects of iodoform it has passed for a very active antiseptic agent; but some investigations have shown it to be a very imperfect antiseptic. And yet neither physicians nor surgeons are willing to dispense with it, and dentists who know its value will not abandon its use until they find some other agent that fills its place, which more active antiseptic agents have not yet seemed to do. This raises a query as to the soundness of the antiseptic or Listerian theory, as it is generally accepted. The distinguished surgeon, Lawson Tait, who was quoted by our essayist, evidently rejects part of the Listerian creed, for it is reported that it is his practice to wash the wound and viscera after his operations in abdominal surgery with tap water,—that is, water drawn from the tap,—without any antiseptic application whatever. He is reported to do this, and to boast of it, as a defiance of Listerism, it would seem.



I suggest these questions not to oppose the theory advanced, nor to call in question the ascertained truths of bacteriology as related to pathology, but to raise a caution signal, lest we drift too easily with the strong current in which we find ourselves. Perhaps Dr. Ormiston can give us some information on these points.

Dr. Ormiston. I do not know that I can give you any information about the value of tin foil. I presume the cavities are cleaned out before the foil is introduced.

President Howe. Sometimes it is rather imperfectly done; and the point is that, as I think, there must be bacteria left there.

Dr. Ormiston. Bacteria do not reach the tubuli until decalcification has occurred in the enamel. Lactic acid fermentation very soon takes place in saccharine or starchy food that may have lodged in the teeth. The way thus being opened, the coccus "a" of Miller enters the dental tubuli and completes the decay.

Dr. Tait does make his boast that he uses tap water in surgical operations; but the basis of all antiseptic treatment is cleanliness, and if you can cleanse the cavity with tap water it is about as well as if you cleanse it with an antiseptic. Of course, there are very few pathogenic organisms after all in the great number of bacteria. Dr. Tait is a very expert operator; he does not take much time, and there is not so much shock to the patients as in many operations performed by others. Shock reduces the tone of the system and allows the entrance of organisms that otherwise would be resisted and excluded by the system. Dr. Tait is very careful in reference to aseptic precautions; his instruments are very carefully attended to, being immersed in boiled water, his sponges in carbolic lotion, and all the details are looked after. It is necessary to success in such operations to thoroughly cleanse the peritoneal cavity; and water will do it just as well as anything,—if you do it. I am quite sure that if he left organisms in the peritoneal cavity he would have trouble.

Dr. Perry. In capping pulps, if we do not thoroughly cleanse the cavity we have trouble. I should be glad to know that iodoform was to be relegated to the shades of oblivion, because of its disagreeable odor. If it is proven to be a weak antiseptic I shall not be sorry; but it would not seem to be so, because of its unquestionable lasting effects. We know very well that if we open a pulp-chamber a long time after it has been treated with iodoform we still get the odor and effects of it, which is not true of carbolic acid and creasote.

I wanted to ask Dr. Ormiston if he would tell us the relative strength or comparative value of antiseptics; which is the best antiseptic now known to the medical and surgical world.

Dr. Ormiston. Bichloride of mercury is by far the most powerful antiseptic that we have; carbolic acid, perhaps, comes next. Car-

bolic acid, a two or three per cent. solution, is used as an antiseptic wash for the hands of surgeons and for their instruments.

Dr. Perry. What is the usual strength of bichloride that surgeons use?

Dr. Ormiston. One to one thousand, and from that down to one to five thousand, if it is to be used as a wash.

Dr. Perry. Do you use it as strong as one to one thousand as a wash?

Dr. Ormiston. It is used as an application in that strength, especially for the final irrigation of operation wounds, also in abscess cavities.

Dr. Perry. Is it as stable as iodoform would be?

Dr. Ormiston. It is quite stable when kept in alcoholic solution ready for dilution. Sometimes a little salt is added to prevent disintegration.

Dr. C. D. Cook moved a vote of thanks to Dr. Ormiston for his very interesting and excellent paper, which was passed unanimously.

Adjourned.

S. E. DAVENPORT, D.D.S., M.D.S.,  
*Editor New York Odontological Society.*

## FIRST DISTRICT DENTAL SOCIETY, STATE OF NEW YORK.

THE First District Dental Society of the State of New York held a regular monthly meeting Tuesday evening, February 12, 1889, in the Academy of Medicine, No. 12 West Thirty-first street.

The president, Dr. W. W. Walker, in the chair.

Dr. Meyer L. Rhein, chairman of the Clinic Committee, read the following

### CLINIC REPORT.

A stated clinic of this society was held this afternoon at the depot of The S. S. White Dental Manufacturing Company, Broadway and Ninth street. The attendance was so large as to crowd the rooms.

. . . Dr. Edward C. Kirk, of Philadelphia, bleached the left superior central incisor of a girl aged sixteen. The upper portion of the root had been previously filled with gutta-percha. The bleaching was accomplished by means of free chlorine and the use of an apparatus which Dr. Kirk will fully describe in the paper of the evening. . . .

Dr. F. T. Van Woert, of Brooklyn, gave a varied and instructive clinic. He demonstrated his method of immediate root-filling on a lower bicuspid, first cleansing the canal with Glidden drills and using hydrogen peroxide and mercuric bichloride. The canal was filled with his antiseptic paste of iodol, oxide of zinc, and vaseline carbolic (see report of December clinic in February DENTAL COSMOS), which was finally covered with oxyphosphate. He also exhibited the

patient for whom he had operated in a similar manner at the December clinic, a porcelain cusp crown having been placed at the same sitting. The root, which at that time was abscessed, to day appeared perfectly healthy. He then demonstrated his method of tipping a tooth with solid gold. For this he has a set of instruments of different sizes, but of two shapes. He prepares the tooth by the use of a facer with a long tit. The instrument forms a perfectly flat surface. The tit enters the canal, which has previously been bored to the exact diameter with a twist drill. The next step in the operation was to wrap around the tooth a narrow strip of platinum, thus obtaining an approximation to shape and size. This platinum collar was then removed and laid on a thin piece of platinum plate, which served as a floor and formed a cup into which gold foil was melted by means of a blow-pipe. To the center of the tip thus made a copper pin was soldered, and the platinum matrix having been removed from the surface with corundum, the tip was properly shaped and polished. His second instrument for facing the tip is the reverse of the tooth-facer. Instead of a tit there is a cylindrical hole, which occupies the center of the facer and allows the instrument to fit over the pin and face the under side of the tip. The surfaces of tooth and tip being made by analogous instruments, the joint obtained is perfect. The tip is set in position with oxyphosphate. Dr. Van Woert showed specimens already in the mouth, and demonstrated the method on ivory models. . . . Dr. M. L. Rhein, of New York city, submitted the results of treatment in a case of pyorrhea alveolaris. . . . Dr. J. W. Cannaday, of Albany, N. Y., filled a crown cavity in the second superior left molar for a girl aged fourteen, using tin and gold in combination. The tooth-structure was of a soft character, and it is for teeth of this grade that the clinician deems the combination of tin and gold especially valuable. . . . Dr. Horace Dean, of Jersey City, presented a lady for consultation. He desired to find out the cause of a bluish discoloration of the gums, starting around the right superior central incisor and extending to the neighboring teeth. Fifteen years previous this incisor had a fistulous opening over the apex of the root, which was finally cured, and the root filled with copper amalgam to gain the antiseptic effect claimed for it. The tooth became black, and the filling was removed and the tooth bleached with sulphurous gas. It has retained a fair color, and the abscess seems cured. The discoloration of the gums is, however, a source of much worriment. The best opinions given agreed that the trouble was probably due to a poor circulation of blood in those parts. . . . Dr. W. W. Walker, of New York, demonstrated the working powers of a new engine-mallet invented and sent to the clinic by Dr. B. S. Byrnes, of Memphis, Tenn. . . .

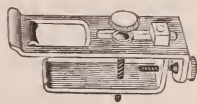


Dr. Thayer, of Brooklyn, exhibited in his own mouth some very extensive and beautiful restorations of the superior teeth, the work of Dr. E. Parmly Brown, who had used gold foil and the electro magnetic mallet. . . . Dr. Geo. Evans, of New York, exhibited a set of instruments devised by him for burnishing collars in crown- and bridge-work. . . . Dr. Reese, of Brooklyn, showed a specimen of improved porcelain crown.

#### INCIDENTS OF OFFICE PRACTICE.

Dr. F. Milton Smith, New York. One of the great annoyances to me in the past has been (and I presume all present have had the same experience) the difficulty of keeping cavities dry at the labial-cervical portion of the incisor, cuspid, and bicuspid teeth, and when the "How" cervix clamp appeared in the November number of the *Cosmos* I thought the prospect good for keeping such cavities dry in the future. Accordingly I purchased one, but although I have had a dozen such cavities since, I have not yet found the one where the clamp will do the work, although I know it will answer for some such cases. The trouble is this: If placed sufficiently high on the labial surface to keep a high cavity dry, it impinges so severely upon the gum at the palatal side as to be almost unendurable to the patient, and in many cases it is absolutely impossible (though you torture your patient) to go sufficiently high on the palatal surface to reach the upper margin of the cavity on the labial surface. Those who have tried to use the clamp will appreciate the situation.

The clamp I now present (see figure) is a modification of the "How clamp," being made of two pieces of steel, so that one side may be placed at any desired height in relation to the other by simply turning a set-screw at the lower end of the clamp. Without this adjusting screw there is danger at times of the clamp slipping off the tooth by reason of its being made in two parts; but should the set-screw or its thumb-head prove any annoyance, the same end may be attained by making a series of holes very near each other, running up and down the face of the outside half of the clamp, so that by placing the *clamping* screw through the highest hole in the face of the clamp and screwing it into the single *screw* hole in the back or other half, the outside will be set for a very low cavity, or almost opposite the other half, while by placing the screw in the lowest hole in the face-piece and screwing into the single or only hole in the back or other half, the outside or face is adjusted to a cavity *very* high, while the bearing at the back only just reaches above the shoulder, causing no pain at all.



The clamp, you will see, trespasses upon Dr. E. Parmly Brown's

invention in the use of a screw to clamp it together, and also upon the "How," and probably others, but I suspect that if you can make terms with Dr. Brown and The S. S. White Dental Manufacturing Company you can have it manufactured.

For myself, I would say that I have not patented my improvements and do not expect to, so that you are welcome to anything which I have brought out in the clamp which may be of service to you; and if the profession experience the relief which I have already felt in the matter of being able to fill such cavities without any anxiety, I shall feel amply paid for my efforts.

Dr. F. A. Roy showed a simple method of protecting the pin of a Logan crown while grinding. (See DENTAL COSMOS for March, 1889, page 239.)

Dr. E. C. Kirk. I would like to report a case which I have lately had under my care, and which has been quite interesting to me. A lady was referred to me by Dr. George T. Stevens, of this city, with a request that I would examine her mouth, to ascertain if any dental origin could be assigned for a severe and persistent facial neuralgia from which she had suffered for between three and four years, with but slight periods of intermission. She was markedly neurasthenic, and had been under Dr. Stevens's care for a complicated ocular defect caused by a lack of parallelism in the visual axes, due to an insufficiency of the recti muscles. The continued effort to accomplish binocular vision under these conditions had resulted in an amount of nervous strain which, among other complications, resulted in pronounced reflex gastric disturbance in the form of nausea, indigestion, etc., with a general condition of intense nervous irritability. The eye phase of the trouble had been almost entirely corrected by Dr. Stevens, and a general improvement in her gastric difficulty had occurred. The facial neuralgia was persistent, and, suspecting that it might be of reflex dental origin, he asked me to examine the case from that stand-point.

The upper jaw I found to be edentulous, and the lower teeth back of the cuspids also missing. Those that remained were in a perfectly healthy condition, and a careful examination of the mouth and jaws elicited nothing abnormal. An examination of the nasal chamber showed slight congestion and hypertrophy of the mucous membrane on the left side, and there was a history of occasional discharges of bloody mucus from the nostril. She stated also that at the time of the extraction of the wisdom-tooth on the upper left side, her dentist had discovered at the bottom of the socket a portion of necrosed bone, for which he, in connection with her family physician, treated her for some months by local medicinal applica-

tions. The socket finally healed. While the symptoms were not typical of catarrhal antral disease, I considered there were sufficient indications of antral trouble to warrant me in opening that cavity, which I did by perforating the alveolar ridge at the position of the second bicuspid tooth. An exploration of the antrum revealed a spot of necrosed bone in the floor of the cavity, at about the position of the second molar tooth, and also a necrosed condition of the edges of the antral foramen connecting that cavity with the nose. The dead bone was removed with burs and spoon excavators, and the surface treated with applications of aromatic sulphuric acid until the process of healing was completed, which occurred between three and four weeks afterwards. During this time, and subsequently, there was no abatement of the neuralgic difficulty. As I could discover nothing further, I referred her to Dr. Stevens again for a final correction of her eye difficulty, telling her that after this was done, and if she found no improvement in her neuralgia, to come back to me, and I would again go over her case to see if I could discover anything further which had any bearing upon it. Nearly three months afterwards she returned, stating that her pain continued as before, and that her life was becoming an intolerable burden by reason of it. The idea of an unerupted tooth occurred to me, and I casually asked the question if she could remember if she had erupted all of her teeth, or if any of them were missing from the arch. She said that she was "quite positive" that she had "never had an eye-tooth on the left side." As she had not the slightest doubt in regard to this fact, I at once perforated the outer alveolar plate at the position of the canine eminence, and, on passing a probe, discovered a cavity in the bone which was abnormal. I was, however, unable to detect the presence of a tooth. I proposed to her a more extended operation for the purpose of deciding as to the existence of an unerupted tooth, to which she promptly acceded. On the following Sunday, in the presence of Drs. Bonwill, C. H. Thomas, and Schneideman, I removed a portion of the outer alveolar plate, about half an inch long, between the position of the left central incisor and cuspid teeth, and found an unerupted cuspid lying in a horizontal position, with the apex of the root in the forward end of the antrum, and the point of the crown imbedded in the symphysis of the superior maxillæ immediately below the floor of the nose, the whole tooth occupying a position at least half an inch back from the anterior alveolar plate. The extraction of the tooth was effected by making a section of it at about the middle of its length by means of a large fissure-bur, after which the root end was first extracted with forceps, followed by the removal of the crown in the same manner.



The after-treatment of the case consisted in washing out the cavity and antrum with phénol sodique through the wound, which was partially closed with sutures at each side, the central portion being allowed to remain open to secure drainage. I have here the specimen, which is presented for your inspection. The effect upon the neuralgia has been noticeable, although the operation is of too recent date (two weeks ago this Sunday) to enable me to report definitely as to the permanence of the good so far obtained. She has had several attacks of pain, but they are not so persistent, nor are they of the same character as that from which she previously suffered; and it is my belief that when the process of healing is complete, her neuralgia, at least from this source, will disappear.

Dr. Dwinelle. The very interesting case which Dr. Kirk has just related reminds me of several I have had in my practice. I will speak of two of them. Some thirty-eight years ago the wife of Judge Mason, then commissioner of patents at Washington, came to consult me in regard to what had been declared a cancer of the jaw. Mrs. Mason was then fifty-five years of age. On examination I found she was wearing a complete upper denture, which she had used for many years. A removal of this exposed to view an angry-looking projection lying obliquely across the palatine arch, which had in its center a pit nearly black in appearance. On exploring this I discovered apparent bone of extreme hardness. With a strong-pointed forceps I broke off a small portion of it, which on a microscopical examination I found was made up of enamel-rods. Having diagnosed the case, I decided to operate, and after dissecting away the surrounding parts I removed a large, well-developed cuspid, which lay across and was so deeply imbedded in the substance of the palatine arch and the nasal fossa, that when I removed it blood flowed freely from the nose. My patient rapidly recovered. I found that the black appearance about the pit of the broken surface was due to the action of nitrate of silver, which some one had applied to cure a "bone cancer."

Another case, that of Hon. Hiram Barney, afterwards collector of the port of New York: He had worn an entire upper denture for years. At the time he came to me he was the victim of a mysterious neuralgic and most agonizing pain, which had been continuous for several weeks, constantly increasing, so that, as he told me, he had not slept a moment for more than a week. He had exhausted the medical skill of the city where he resided, and then appealed to our own, thus far without relief or an intimation as to what might be the cause of his trouble. When he came to me he was in a condition bordering on insanity, from excruciating pain and protracted insomnia. On examining the palatine arch, I discovered an unusual

prominence extending obliquely across it. I naturally diagnosed the presence there of a tardy tooth, which, like a foreign substance, was pressing severely on the superior maxillary nerve, the cause of all his trouble. I made a crucial incision into the prominence, and after removing the flaps I cut away with a strong lancet a thin covering of bone, exposing the tooth beneath, which I extracted, giving my patient immediate and permanent relief. This tooth was also a cuspid.

Dr. Edward C. Kirk, of Philadelphia, read the following paper on

#### THE CHEMICAL BLEACHING OF TEETH.

Mr. President and Gentlemen: If the matter which I shall have the honor of presenting for your consideration this evening shall appear to be somewhat elementary in character to many of you, I will ask the indulgence of those to whom the subject is familiar, for the reason that I am persuaded by observation that the subject of bleaching teeth, particularly as to its basal principles, is not so generally or well understood as the importance of the subject demands, and that the average of success attending the efforts of dental practitioners to decolorize darkened teeth following pulp-devitalization is not so great as it should be, if a better and fuller understanding of the subject was at their command.

I shall confine my remarks to that class of true bleaching operations which depend for their success upon the destruction of the coloring matter in the dentinal tubuli by the action of some chemical agent sufficiently active for the purpose, merely alluding to the existence of those methods which may be called mechanical or physical, and which depend upon the removal by excavators of sufficient of the discolored dentine to render the tooth-walls translucent, and lining the cavity with a white or light-colored cement which, showing through the thin tooth-walls, gives a lighter appearance to the color of the tooth operated upon.

While such a course is of value in some cases, those for instance where but little of the dentine remains, and where its removal is indicated under any circumstances by reason of its softened or semi-decalcified condition, it is obvious that a tooth so treated is greatly weakened, and no application of cement as a lining can restore its power to resist strain to the extent which it possessed before. The mechanical treatment of discolored teeth which I have just outlined should be confined to that class of teeth where nearly the whole of the dentine has been affected or removed by caries, and we have to deal only with the translucent enamel-walls.

We come then to the class of substances which are true chemical bleachers, and to the methods which have, up to date, been found

best for their successful application to the bleaching of discolored teeth.

Bleaching in general may be defined as a chemical reaction between a compound having color, and some substance capable of affecting its composition in such a manner that the color is discharged, or, in other words, of so affecting the integrity of the molecule of the coloring matter as to destroy its identity, which necessarily results in a loss of its distinguishing physical characteristic,—viz, its color.

All chemical changes in matter are the result of, or flow from, an alteration in the kind, the number, or relative position of the atoms which compose the molecule; from which it follows that anything which affects the composition of the molecule necessarily alters the character or identity of the matter operated upon, so that it no longer exhibits the properties which belonged to it before such alteration was made.

A single familiar example will serve to illustrate this. Sugar, which has the composition  $C_6H_{12}O_6$ , may be dissolved in water indefinitely almost, and within certain limits it can still exhibit the properties of sugar, is recognizable by its sweetness, and may be recovered in the solid crystalline form by evaporation of the solvent. The mere act of solution has not affected the composition of its molecule; but if we drop a lump of sugar on the stove, or pour over it concentrated sulphuric acid, a dissociation of the atoms in its molecule takes place by the abstraction of its water-forming elements H and O, and we have the carbon remaining as a black, coke-like mass. This we understand to be a chemical change.

Now, all organic substances have as their distinguishing component, carbon, united generally with one or both of the elements H and O, and, in those resulting from tissue-metamorphosis, nitrogen. It is not necessary for our present purpose that we should know the exact composition of the detritus of pulp-tissue and broken-down food substance which gives rise to tooth-discoloration. It is sufficient if we recognize that it does contain the principal elements which I have named as common to organic compounds. Accepting this to be the case, we can then understand the effect of bleaching agents upon it.

Two general classes of substances have been introduced to the profession for the purpose of bleaching teeth. The first, those which act as oxidizing agents, and which destroy the integrity of the coloring molecule by removing its hydrogen; the other, those which act as reducing agents, and destroy the integrity of the coloring molecule by removing its oxygen.

To the first class belong hydrogen peroxide,  $H_2O_2$ ; potassium



permanganate,  $K_2Mn_2O_8$ ; chlorine and the chlorine group. To the latter, sulphurous acid,  $SO_2$ .

In the first class, the action of the first two substances named—viz, hydrogen peroxide and potassium permanganate—is readily understood when the character of the compounds is taken into account. Both are rich in oxygen; both are unstable and ready to give up their oxygen in the nascent state at any favorable opportunity; and when brought into contact with organic matter rich in hydrogen, the latter is seized upon by the liberated oxygen to form water, and both compounds as such are destroyed.

The main practical difference in the action of the two substances is in the character of the resulting by-products. Thus in the case of hydrogen peroxide,  $H_2O_2$ , the loss of its one atom of O leaves simply a molecule of water; but in the case of the potassium permanganate there results among other things manganese dioxide,  $MnO_2$ , a dark brown solid which in itself produces a discoloration that must be gotten rid of afterwards by solution in oxalic acid, with which it forms an almost colorless and soluble compound. I have used this substance for bleaching teeth, but care must be exerted not to use it in a too concentrated solution, otherwise the final treatment with oxalic acid may fail to completely remove the discoloration from the manganese dioxide which has been precipitated in the tubuli, and leave the tooth in worse condition than at first. Used with care, in dilute solutions of a deep claret color, and almost immediately followed by a strong oxalic acid or binoxalate of potassium solution, I have obtained good results when the tooth-structure to be bleached was not very thick or dense.

That its bleaching powers are quite active, I think I can demonstrate very satisfactorily with these dark sponges. I have here some unbleached sponges of the natural brown color which they possess when taken from the water. I have prepared here a glass jar containing a solution of potassium permanganate. On immersing the sponge in this solution for a few moments, you readily observe a change in the color, which has passed from a light brown to a dark brown, almost bordering on black. A chemical action has taken place between the permanganate and the coloring matter of the sponge, which has resulted in the destruction of the latter, and the deposition of the brown oxide of manganese throughout its texture. If I now apply a solvent which will remove the deposited oxide of manganese, the result of the bleaching or oxidizing action of the permanganate of potassium will be evident. We have a suitable solvent in the solution of oxalic acid, which I have prepared in this other glass jar, and upon immersing the sponge for a few moments you see its color is discharged, and it comes out

beautifully bleached. I hold up for your inspection the bleached sponge alongside of one which was not treated, and, as they were originally both of the same color, the difference is at once evident.

The use of hydrogen peroxide is sufficiently simple, and does not require any especial elaboration here. I have not succeeded with it as well as some other operators appear to, as the teeth treated with it seem to resist the action of the peroxide after a certain point has been reached, leaving them of a brown or yellowish tint.

By far the most interesting and important agent we have for the bleaching of teeth is chlorine, for the introduction of which, and its first successful application to the bleaching of teeth, we are indebted to Prof. James Truman, of the University of Pennsylvania, some twenty-five years ago.

In my classification of this substance, I placed it among the oxidizing bleachers. The reason for this is that while in a few instances, and under special circumstances, chlorine may act directly upon the coloring matter by uniting with its hydrogen, yet it has been found in practice to act with much greater rapidity and energy in the presence of moisture; in fact, some organic colors are absolutely unaffected by chlorine in the absence of moisture. These facts have led investigators to the conclusion, and I believe it has been demonstrated, that chlorine acts by first seizing upon the hydrogen of a molecule of water with which it combines to form hydrochloric acid, and the oxygen which is liberated in the atomic or nascent state attacks the coloring matter and destroys it, the chlorine being thus, indirectly only, an oxidizing agent,—the relation of the chlorine to the oxygen in the bleaching operation being, in some respects, similar to that of the monkey and the cat in the fabled chestnut-eating episode.

Prof. Truman's method, which is now so generally known as to need no extended description, depends upon liberating chlorine from calcium hydrochlorite, commonly called bleaching powder or chloride of lime, in the cavity of decay and pulp-canal by some weak dilute acid. He prefers and recommends a fifty per cent. solution of acetic acid, though oxalic, citric, or tartaric acid may be used; in fact, any dilute acid will serve to liberate the chlorine. The treatment of the tooth previous to bleaching is the same for all methods. The upper third of the pulp-canal should be solidly filled with gutta-percha. Gold has been recommended, but should not be used in any tooth to be bleached with chlorine, as it is attacked by the latter, and the auric chloride formed decomposes in the presence of organic matter by the action of light and oxygen, and results in a permanent purple stain, which cannot be gotten rid of. For

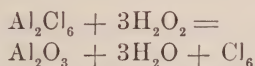
this reason, a tooth to be bleached should have any gold fillings removed, if they are in position.

The cavity should in all cases be washed out with ammonia or borax to remove fatty matter, and no substance which has the power to coagulate albumen should have been used, as such prevents the ingress of chlorine to the tubuli. For the final washing, distilled water should be used, as river water ordinarily contains sufficient iron to stain the tooth in combination with the chlorine as ferric chloride.

Lastly, after the bleaching is completed, the cavity and pulp-canal should be filled with white oxychloride of zinc, which should be inserted with instruments of bone, hard rubber, or wood. It should be carefully borne in mind that no metallic instrument should come in contact with the tooth after the chlorine has been applied.

Since the publication of Dr. Truman's method several modifications of it have been brought forward; thus, the solution of chlorinated soda, known as Labarraque's solution, has been used as a medium from which to liberate the chlorine. The principle is, however, in all respects identical with that of Dr. Truman's method.

An interesting method, somewhat different from that of Dr. Truman's, was introduced by Dr. A. W. Harlan, of Chicago, in 1884. He uses aluminium chloride in the cavity, from which he liberates the chlorine by means of hydrogen peroxide, thus:



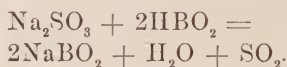
The bleaching is performed by the chlorine, which is liberated by the action of  $\text{H}_2\text{O}_2$ .

In 1882 I brought to the notice of the profession, in a paper read before the Odontographic Society of Pennsylvania, the results of a method for bleaching teeth which I had used with good results for about a year previously, and based upon the activity of sulphurous acid ( $\text{SO}_2$ ) as a bleacher. This substance has a large application in the arts for the bleaching of straw goods, woolens, etc., and its method of action is entirely opposite from that of chlorine. It has a strong affinity for oxygen, and belongs, therefore, to the class of substances which we know as reducing agents, and in its relation to the operation of bleaching teeth I have placed it in the second division of the classification which I made at the beginning of my paper, viz: bleachers which act by virtue of their affinity for oxygen, and in which class it so far stands alone.

My method consists of liberating sulphurous acid,  $\text{SO}_2$ , from sodium sulphite,  $\text{Na}_2\text{SO}_3$ , by means of boracic acid. The two substances, in the proportion of 100 grains sodium sulphite and 70



grains boracic acid, are desiccated separately, and then intimately ground together in a warm, dry mortar, after which they are kept in a tightly-stoppered bottle for use. In using the powder, the tooth is prepared in the usual way, and carefully dried under the dam. The powder is packed into the pulp-canal and cavity until both are full; the reaction which liberates the sulphurous acid is then brought about by moistening the powder in the tooth with a drop of water, and the orifice of the cavity is immediately closed with warm gutta-percha. The reaction which ensues is as follows:



I have had very gratifying results from this method, and have found where it was at all useful that it bleached through greater thicknesses of dentine in less time than when chlorine was used. It may also be used in connection with steel instruments.

Some discolored teeth resist the action of any bleaching agent to a much greater extent than others; whether it is due to the presence of some substance in the tubuli which prevents the ingress of the bleaching agent, or whether to the existence of some compound which is but slowly acted upon, I am not at present able to state. My impression is inclined to the latter view, as I find that when the color is brown or yellow in character, the bleaching is slower and more difficult.

I have found also that where I have failed with chlorine I have succeeded with sulphurous acid, and conversely. Quite recently Dr. Edwin P. Wright, of Richmond, Va., has devised an ingenious apparatus for the application of free chlorine to the teeth for bleaching purposes. It consists of a glass face-piece, to which the rubber-dam is attached, making a closed envelope into which the gas is conducted and projected against the interior of the tooth by means of a rubber bulb and tube, terminating in a vulcanite jet. The chlorine is contained in a jar or bottle, which is previously filled with the gas in the laboratory. From this it is pumped through flexible tubing into the tooth, and back to the bottle by means of a return tube of flexible rubber which connects the face-piece and bottle. It was this method that I had the pleasure of demonstrating at the clinic to-day.

Dr. Wright's device marks an advance in the operation of bleaching teeth, as it furnishes us with a means of applying either chlorine or sulphurous acid directly to the tooth without the annoyance of the formation of any side products, which undoubtedly too often interfere with the efficacy of the bleaching agent; and the method is absolutely devoid of any chance of irritation to the air-

passages of the patient, which renders the direct application of these gases practicable,—a result heretofore impossible.

I expected to have here this evening the apparatus which I used in demonstrating Dr. Wright's method at the clinic to-day, but unfortunately the messenger has not arrived with it. I will endeavor to explain a slight modification in the face-piece which I have made in the arrangement as originally devised by Dr. Wright. A glass vessel, shaped like a bell-jar, of about two inches in diameter and the same in height, with a flange around its base, the upper end terminating like a bottle-neck, is clamped to the rubber-dam, while it is applied to the tooth to be bleached through the agency of a hinged, double-ring brass clamp, and through the bottle neck end the gas is pumped to the tooth and back to the reservoir. This portion of the device is my own, and possesses the advantage that the ordinary rubber-dam may be utilized, the original apparatus of Dr. Wright requiring a special form of rubber-dam to be prepared for the purpose.

In regard to the permanency of these bleaching operations. Failure to successfully bleach a tooth in the first instance may depend upon the presence of some coloring matter which cannot be broken up by the bleaching agent, or be due to a clogging of the dentinal tubuli by some fatty, resinous, or other matter which prevents the ingress of the bleaching agent. Teeth which have been bleached to a certain point and then return to their original state of discoloration do so, I think, for the reason that the operation has not been thoroughly performed, which may mean that the action of the bleaching agent has not been continued long enough, or that the tooth has not been bleached sufficiently high up into the root, or the subsequent filling has not been thoroughly performed. It may also arise from metallic instruments being used in connection with the chlorine process or the subsequent operation of filling.

Another class of teeth which present what I believe to be a fertile source of failure in point of permanency are those in which recession of the gum has occurred until exposure of the cementum has taken place to a considerable extent. I have reason to believe that such teeth are liable to re-discoloration by the imbibition of the oral fluids through the cementum. While I do not wish it to be understood that I have succeeded in all cases, yet I have had such a degree of success that I regard the chemical bleaching of teeth as an operation which is not only legitimate, but should be undertaken in all cases of discolored front teeth, with the expectation of removing one of the most unsightly defects we have to deal with in the human teeth.

Dr. Dwinelle. The subject of bleaching teeth is one of peculiar

interest to me. At a meeting of the American Society of Dental Surgeons held at Saratoga in August, 1848 (see *American Journal of Dental Science*, vol. i, new series, page 57), I introduced to the profession a series of experiments in regard to bleaching teeth which attracted considerable interest at the time, and which I have since, with others, practiced up to the present with varying results. I think I rarely failed to improve the color of teeth, no matter how much they may have been impaired. I often see some of these cases, and find many of them unchanged after years of service.

The idea of bleaching anything naturally suggests chlorine in some of its forms, it being a great chemical bleacher. So, also, is sulphur and some of the acids. I used chloride of lime and chloride of sodium, and often produced good results by packing discolored teeth with a paste of phosphate of lime. It was a theory with us in those days, before the advanced chemistry of the present, that teeth were stained by the iron contained in the blood, the corpuscles of which were broken up by concussion, so that its coloring matter was diffused through the porous texture of the tooth. It is well known that oxalic acid is a reagent or solvent of iron under certain restrictions in its use, and I have often had excellent results from it in bleaching teeth. The use of the vapors of sulphur seemed at times to be very successful with me.

I realize to-night that my efforts, though often entirely successful, were yet comparatively crude. Dr. Kirk's paper has been a rare treat this evening. He has made everything so clear and lucid that "he who runs may read," in a manner so exact that we may regard his illustrations, especially on the blackboard, as the very *mathematics of chemistry*. How beautifully he has demonstrated the laws of correspondence and affiliation! I think his method of using chlorine as presented to us may yet supersede all others. I feel that he has placed us all under great obligations to him.

Dr. S. G. Perry. One of the gentlemen sitting near me has just whispered that he considers it comparatively easy to bleach teeth, but he finds it difficult to have them remain so. I think this will be found to be the experience of most of us. For my own part I have long since abandoned the use of bleaching agents to any great extent, because I have found at times the teeth returned to the original color, or sometimes changed to a different color quite as unsatisfactory. For many years I have depended more or less upon cutting away the discolored portion of the tooth, so far as it could be done consistently with the strength of the structure, and I have used white oxychloride of zinc as a lining, depending upon the translucency of the tooth. But, of course, that implies the weakening of the tooth, and it also results in an unsatisfactory condition, owing



to the fact that the color of the tooth is changed unevenly. Where the enamel is thin the color will be greatly improved; but towards the cutting-ends of the teeth, where the two plates of enamel coalesce, the change will not be very great; so that it has never been a very satisfactory method of managing such teeth. My failure in bleaching teeth by the use of chemicals has probably been due to the fact that I did not follow the scientific rules that are laid down so clearly in Dr. Kirk's paper. I consider this paper one of the most valuable that has been read before this society in a long time, and I shall endeavor in the future to apply the methods that are so clearly stated.

I should be very glad if Dr. Kirk would tell us a little more definitely of the relative success of his system of bleaching as applied in practical cases; for instance, how much improvement has he sometimes been able to make in discolored teeth, and for how long a time have those teeth remained in that improved condition; and have some of his teeth returned to their original color, in a greater or less degree, after having been so treated, and after what periods of time?

Dr. Kirk. In answer to Dr. Perry, I regret to say that I have kept no tabulated record of my bleaching cases, and am therefore unable to give him as definite an answer to his question as he might desire; but as to the length of time which these teeth remain bleached, I would say that about six years ago I bleached a badly discolored central incisor for a young lady, using my sulphurous acid method. I saw the tooth about a week ago, and the color was so good that I failed to recognize it at first as a devitalized tooth, having forgotten that I had previously treated it. This is not an exceptional case; my experience being that when teeth are thoroughly and carefully bleached to a shade somewhat lighter than the adjoining teeth, while they may occasionally recede some from that point, they never become discolored to the extent they were before treatment. The bleaching of teeth has yielded me better results, and given me more faith in it as a legitimate proceeding in operative dentistry, than the operation of capping exposed pulps.

Dr. Perry. What is the remedy for devitalized teeth which have become discolored by copper amalgam fillings?

Dr. Kirk. Such a discoloration is no doubt due to the formation of metallic salts or compounds in the structure of the dentine, and, so far as I know, is beyond the reach of any bleaching agent. I had a curious case illustrating the effect of metallic salts in coloring tooth-structure presented to me some two or three years ago, where a dentist had used retaining-screws made from pure nickel as anchorages for large contour fillings in approximal cavities in the central incisors. After a time a discoloration occurred about the screws,

which gradually extended through the tooth-structure until they were dyed a beautiful apple-green. Various processes for bleaching were tried, but without avail, and the only course which could be pursued to correct the glaring defect was to cut off the teeth and replace them by porcelain crowns. Dr. Hill has referred to a peculiar discoloration which I have seen under two different sets of conditions,—one in which a sudden and violent pulpitis occurred from some systemic or constitutional cause in teeth unaffected by caries, in which, though the tooth was quite pink for a day or two, resolution occurred without death of the pulp, and its color returned to its normal shade. I think such a case is rare, as I have met with but two or three. The other condition under which the pink effusion takes place is in teeth of a porous or loose texture with exposed pulps, where sudden and violent congestion of the pulp has occurred, either from natural causes or from applications of devitalizing paste, and where the pulp dies, leaving the disorganized organic constituents of the blood in the texture of the dentine, not in the form of red blood-corpuscles, but probably in the form of broken-down hæmaglobulin. I have found teeth so discolored to resist attempts at bleaching when undertaken soon after this extravasation has occurred, but after a time, when normal decomposition has proceeded to a certain extent, and the tooth has changed in color from the pink or brown shade to a gray or bluish, they respond without difficulty.

Dr. Atkinson. The question before us is one of pigmentation. What is it? How is it? And what can we do to abolish or ameliorate its unsightly presence in the mouths of those who consult us? It is a chemical question *par excellence*,—a question of molecular metamorphosis, the degrees and extent of which are but poorly understood. There are two phases in which it makes its appearance: 1st. The least frequent and nearly unnoticed form which occurs in teeth with living and, as far as the patient knows, healthy pulps and entire teeth, which assume various shades of pink, continuing for a time, and then returning to normal state without detriment to the teeth to all appearance. A few instances occur in which the pulps finally succumb and have discolored crowns of various shade, from a slight grayish opacity to the deeper shades of dark and unsightly teeth so common where the pulps are killed by disease, accidental blows, or applications of the “knocking-out” method with wooden pegs or arsenious acid administered “prepnese.” Albeit it is hardly fair to attribute badly discolored teeth to the immediate extirpation of pulps by mechanical methods, and it is difficult to discriminate between these pulpless teeth and those deprived of nutrition to the body of dentine by atrophy.

I am delighted with the presentment of so deep a subject by one who gives such clear evidence of having comprehended it himself and having worked it out so well as to formulate it in terms to help those who have worked a little in this direction to follow his beautiful lead. And above all would I indorse and commend the unusual discrimination made as to the nascent and inactive states of atomic mass. He said that newly-formed atomic mass was in the nascent condition, or ready to be born into molecular mass by the combination of definite numbers of atomic bonds. But when the mass of atoms had stood for a time, loosely-held bonds formed the mass into a sort of molecule not in first-class condition for combining with diverse atoms forming molecules properly so-called, proximate principles ready to be wrought into mineral, vegetable, and animal bodies.

If the chairman of the clinical committee had no other cause for gratitude and congratulation in view of his work, the single case of restoration to health of the bad case of pyorrhea alveolaris which he presented at the clinic and reported to-night should cause him to rejoice and cheerfully go on with the beneficent work so admirably prosecuted thus far. I feel encouraged and gratified at the good work the young men are doing,—specially pleased with the clear-cut and truly scientific methods pursued by the essayist of the evening.

Dr. Kirk. Mr. President, I wish to thank Dr. Atkinson personally for the comprehensive mental grasp of the principles of this matter which he has given us, and to say still further that, by reason of it, I shall go back with a better understanding of the subject than when I came.

Adjourned.

B. C. NASH, D.D.S., *Secretary*.

## CHICAGO DENTAL SOCIETY ANNIVERSARY.

### FIRST DAY—*Evening Session* (Continued).

(Continued from page 190.)

DR. J. H. MARTINDALE, of Minneapolis, Minn., read a paper on  
CARIES AND NECROSIS IN THEIR RELATION TO PRACTICAL DENTISTRY.

He first considered caries and necrosis as affecting the osseous system, and said that in a pathological sense diseases of bone are identical with those of other tissues. Such differences as exist are due to anatomical and physiological peculiarities of the structure, diseased action being modified by texture. In bone it is modified by the presence of calcareous substance, which is inorganic.

Caries and necrosis of the jaw and alveoli always point to a previous state of inflammation, although inflammation is not always followed by necrosis or caries. Inflammation can only attack vital tissue.



In the jaws this is found in the periosteum, in the bone-cells and in the inosculating of their canaliculi, and in the Haversian canals. When inflammation of this highly vascularized periosteum has been induced in the maxillæ or the alveolar appendages thereof by traumatism, septic infection, cachexia, or by specific mineral poisons, and proceeding through the successive stages of increase of blood, multiplication of the leucocytes, and congestion, and finally reaching complete stasis so that nutrition is cut off from a considerable and definite area of bone, *necrosis* must necessarily result. If complete arrest or infection shall not have been reached, but the blood-current has become slowed, this does not follow. Caries of bone is the slower process of tissual death of the bone, molecule after molecule being cast off with pus, in the form of bone earth.

The two terms *necrosis* and *caries* are frequently used by dentists interchangeably without true conception of their difference. *Necrosis* of bone is similar to gangrene of soft tissue; *caries* to ulceration. *Caries* presents a well-contested battle-ground where life and death are nearly contiguous. *Necrosis* is like a besieged citadel, sorely oppressed, supplies cut off, and forced to surrender *en masse*.

Some of the blood-taints or cachexiæ which predispose to *caries* are the exanthematous diseases of childhood, especially measles. Constitutional syphilis is also a predisposing cause, though many cases charged to syphilis are due to mercury.

Dr. Martindale then referred to the processes of treatment in cases of *caries* and *necrosis* of the bones and in alveolar abscess, describing the scraping and burring away the dead bone and the use of aromatic sulphuric acid to dissolve the deposits of calcareous substance around the teeth.

#### *Discussion.*

Dr. W. H. Atkinson expressed his approval of the paper. As to the way we should get rid of carious or necrosed portions of bone, we cannot give hard and fast rules. This subject of pus-forming is one to which he has devoted much time. When tissues have been swollen and melted down until the granules have been entirely separated, this is pus. It is never green, never putrid, never offensive, and never reparative. These granules are incorrectly called leucocytes by many; they are not made from the blood. When an abscess is opened and is found filled with greenish substance it is not pus, but is sanies.

In the treatment of diseased bone we use aromatic sulphuric acid, which is sulphuric acid diluted with aromatic tinctures, and these tinctures possess a therapeutic value which gives the preparation a different quality from diluted sulphuric acid. This affects the terri-

tory between the caries and the sound bone, which has been called the line of demarkation, by coagulating the albumen present and forming a scab under which the proliferation will be thrown off, just as a scab would come upon any mucous surface which was kept moist.

In cases of pyorrhea the treatment by aromatic sulphuric acid will succeed if carried out thoroughly. The necessary laceration of the gum-tissue is not serious, because the gum is an embryonic tissue and has reparative powers far above those of other tissues; the wounds will heal and lost parts be restored. The new tissue cannot be called scar-tissue, as it is identical in structure and appearance with the normal gum. In cases where a very large part of the flesh had been removed to get at necrosis of the jaws, he would advise sponge-grafting.

Dr. T. W. Brophy said that the study had not been given to dental caries which its importance deserves. We find cases which have been unsuccessfully treated for alveolar abscess when the disease was in the bone. In such cases, if the treatment is simply opening into the tooth for drainage with the expectation that nature will effect a cure, we will be disappointed. We must do something more. In such a case an incision should be made down to the diseased bone, packing it with iodoform gauze or boracic acid gauze. The next day make an ocular examination of the part. By this means the extent of the disease will be known. Then with a bur the affected roots of the teeth should be cut off, because they are a source of irritation. With a bud bur pass over the bone and remove the dead portions. The wound should be again packed with antiseptic gauze. In a day or two make another examination, and if the little red eyes so often described by Dr. Atkinson are seen peering up we will know that it is getting well. In this case insert a wax plug, which is better than gauze, as it is not permeable. It must be kept there long enough to prevent the closing of the wound and the consequent trouble from confined pus.

Dr. Martindale, in concluding the discussion, said he had not found sponge-grafting successful. He did not agree with Dr. Atkinson's theory of retrogression of cells; his idea was that the change was from life to death of the tissue, and not from one form of life to a lower form.

Dr. G. V. Black, of Chicago, Ill., read a paper on

#### ANTISEPTICS.

Dr. Black stated that his paper embraced the result of experiments to determine the value of the essential oils as antiseptics; also

incidentally, and for comparison, of other articles used as antiseptics. He had been impressed with the general lack of exact knowledge about the real and comparative antiseptic value of the essential oils. Some reputed antiseptics could not be relied upon in surgical operations nor in the treatment of suppurative affections. Iodoform is an instance, and really has no antiseptic value. Whatever may be its therapeutic value, it is certain that in any solution which can be made it is in no sense an antiseptic.

He defined the word antiseptic as that which inhibits the growth of microbes; disinfectant as that which destroys them. The same drug may be used for both purposes, but differently and in different proportions. As a general rule, disinfectants cannot be used, as such, in medicine and surgery, because the poisonous properties would do more harm than disinfection would do good. The roots of teeth may be disinfected, and in some favorable positions, as in very small abscesses, disinfectants may be brought in contact with the soft tissues, but for the most part we must use the milder remedies and rely upon antiseptic procedures. Even pure essential oils differ in value, owing to different conditions of the plant from which they were made.

Dr. Black detailed at length his experiments with the incubating oven. Each observation extended over five days, unless growth of micro-organisms was discovered earlier, and notes of everything important were written when observed. Observations were made in some cases every twelve hours; in others every twenty-four hours. With the essential oils he made the experiments both with the oils in substance and in solution,—saturated aqueous solutions unless the percentage is given.

A study of the table which accompanies the paper shows that some of the oils have no antiseptic value, and a wide range in value of those which inhibit growth. The point of concentration at which many articles would inhibit growth of micro-organisms is very close to the point at which they will work serious mischief to the animal tissues, or at which they would be liable to produce toxic effects by absorption. There are but few exceptions to this rule. Generally the greater the antiseptic value the more poisonous the drug. Bichloride of mercury, in the absence of albumen, has a very great range of antiseptic power, but at the same time it is exceedingly poisonous. On the other hand, the preparations of eucalyptus are very feeble poisons, but nothing short of a saturated solution is effective as an antiseptic. The preparations of eucalyptus, however, eucalypti extract and eucalyptol, exert a restraining power. The oil of cassia has a wider range of antiseptic value, all things considered, than anything he had tried. It is also the most effective anti-



pyogenic which he had yet employed. It may be used in the form of an emulsion in any but very large abscesses or infected wounds. The pure oil, or the oil diluted with a bland oil, is a most excellent dressing for root-canals and abscesses. In substance, however, it should not be too frequently applied in the case of abscesses, on account of its irritating properties. It is this oil which renders the following mixture so efficient :

Carbolic acid, 1 part ;  
Oil of cassia, 2 parts ;  
Oil of wintergreen, 3 parts.

His original thought in this mixture was to get the antiseptic property of carbolic acid without its objectionable action on the tissues, but after using it for a while he found that it has an antiseptic range greater than carbolic acid, with a desirable modification of its irritant qualities.

He divided antiseptics into three forms suitable for different cases : first, a solution in water ; second, the oil ; and, third, the powder. Each of these has special advantages for special uses. The aqueous solution is useful for cleaning infected surfaces of wounds and washing out abscesses ; indeed, in any case where there is something which can be removed by washing. Every part of the affected territory is better reached in this way than in any other. To have the full effect of this form of antisepsis would require the washing to be continuous. As this is generally impracticable, this method is very much limited. In dental practice this form of antiseptics is limited to the cleaning of infected parts, and cannot be trusted to prevent septic action for any extended time. A solution in peroxide of hydrogen is better than in water, because of the mechanical effect of the ebullition of the oxygen evolved in mixing the antiseptic with the secretions. There may be some antiseptic value in the oxygen, but he thought its principal value is the mechanical one, although that is very important. Thorough cleansing is an excellent antiseptic procedure, and the peroxide of hydrogen does it in many cases where nothing else will, and at the same time carries the antiseptic to the more remote parts of the wound or abscess.

After thorough cleansing in this manner, a stronger antiseptic effect is necessary. According to conditions, we choose between oils and powders. If it is an abscess which is being treated, an oil which is in itself an antiseptic, or an oil holding an antiseptic in solution in effective proportions, may be introduced into the cavity and so agitated as to bring it into contact with all of its parts. This, on account of its sparing solubility, will remain in position very much longer than an aqueous solution. An essential oil is much more

diffusible than a fixed oil. In roots of teeth any except the most irritating of the antiseptic essential oils may be used to advantage and relied upon for several days together.

In the choice of an essential oil, it is best to select an antiseptic of moderate range where it is only required to preserve an aseptic condition. For instance, where a foul root-canal is opened, such an antiseptic as the oil of cassia is indicated. After appropriate cleaning, or in case the cleaning has to be deferred for fear of forcing poisonous matter through the apical foramen, it may be used in full strength and relied upon as an antiseptic also. Subsequently, when it is only a matter of maintaining an aseptic condition during the healing of the parts, an antiseptic of shorter range that is not as liable to injure the tissues is to be preferred. For this purpose the eucalyptic extract in substance is a useful agent; its range of actual inhibition is sufficient, and its effect on the tissues so slight that the healing process may go on in its presence without hindrance.

The oil of cloves and the oil of cinnamon seem to occupy a middle ground, and may be made useful in a large class of cases if the others are in anywise disagreeable to patient or operator. The oil of mustard, though a good antiseptic of short range, has an irritant action that limits its use, but in cases where it is desirable to arouse the tissues from a state of inactivity, this action is combined with its antiseptic quality. Any of these oils may be used in the form of emulsion, and this form is recommended for suppurating wound surfaces and the washing of abscesses.

He emphasized the statement that an antiseptic is a poison. It is antiseptic by virtue of its power to restrain life-forces. The use of antiseptics is only permitted by shades of difference in the action of certain poisons toward the different forms of life, by which the fungi are more destructively affected than are the animal tissues. Each antiseptic has its own special quality of poisonous effect, and a choice is to be made of antiseptics for application in special cases. For instance, one acts by benumbing the parts to which it is applied and slowing of the life-processes, another by the reverse action of quickening these movements. The one is a depressant irritant, the other a stimulant irritant. These properties are happily combined in the mixture to which attention has been called.

The use of antiseptic powders is known in surgery as dry dressing. For this purpose a crystalline antiseptic is required, the saturated solution of which is not too irritating. Very poisonous drugs cannot be thus used. Boracic acid seems to stand at the head of the list, the irritation produced by it being of such nature as not to hinder the growth of granulations. Hydronaphthol, betanaphthol, and salicylic acid may also be used in the same way.

All antiseptics should be continuously applied until the wound is healed. Antiseptics are not disinfectants; they do not destroy micro-organisms, only prevent their growth. If the antiseptic is discontinued or diluted below its effective strength, sepsis may occur or recur.

Another form in which crystalline antiseptics have an important though limited use is by hypodermic injection. For this purpose those which are but slightly soluble in water or the juices of the flesh are dissolved in ether or similar menstruum, and injected into the tissues. By this plan some affections may be treated successfully that cannot be reached by any other form of application, such as erysipelas, progressive gangrene, and others of like nature.

Antiseptics placed in root-canals will not enter the region beyond the apical foramen unless forced through at the time of application.

The relation of albumen to antiseptics is of importance; its presence contra-indicates bichloride of mercury, as there is an antagonism between them. There can be no reasonable doubt about the effectiveness of bichloride of mercury in the absence of albumen, therefore it should hold the place it has gained for the disinfection of instruments and of the skin previous to operating. It should, however, be used in greater strength than has generally been employed for these purposes. The presence of albumen does not modify the action of oil of cassia.

*Table of Results of Experimental Tests of the Value of Antiseptics.*

The antiseptic value of a drug is best expressed by its range of effective work. This *range of value* is found in the difference between the saturated solution, or that concentration that may be found injurious to the tissues, and the greatest dilution that inhibits the development of micro-organisms. Those essential oils that are not too irritating have an extension of range in their use in emulsion, or in substance. Also many drugs have, in greater dilution than that which actually inhibits, a range of restraint that is useful. Only positive inhibition is marked in the tables. The values of the essential oils are given for the oils in substance, for the solutions, and for the derivatives. All aqueous solutions are saturated unless the percentage is given. The figures in common type show inhibition of growth by that proportion of the drug, or its solution. Those printed in bold-face type show a failure of inhibition within twenty-four hours. Bold-face type with the addition of an \* shows a failure on the second day, with the addition of \*\* a failure on the third day, and so on.

Aseptol (Merk's 33.3% sol.).....	1-10, 1-15, 1-20, <b>1-25</b>
Benzoic acid (sol).....	1-1, <b>1-2, 1-3.</b>
Betanaphthol (sol.).....	1-1, 1-2, 1-3, <b>1-4, 1-5.</b>
Boracic acid (sol.).....	1-4, 1-6, <b>1-8*, 1-10.</b>
Carbolic acid.....	1-300, <b>1-560, 1-900.</b>
5% solution....	1-8, 1-10, 1-12, 1-15, <b>1-20.</b>
Copper sulphate (sol.).....	1-100, <b>1-200*, 1-400.</b>



- Creasote (Commercial).....1-400, **1-500, 1-900.**  
 Morson's wood tar.....1-700, 1-910, **1-1200.**  
 Solution..... 1-1, 1-2, **1-4, 1-8.**  
 Hydronaphthol (sol.).....1-1, 1-2, 1-3, **1-4, 1-5.**  
 Iodoform.....Growth in the saturated solution  
 among the undissolved powder.  
 Mercuric bichloride.....1-25000, 1-50000, **1-100000.**  
 1-500 solution.....1-50, 1-100, **1-200.**  
 Resorcin (6.5% sol.)..... 1-4, 1-6, **1-8\*, 1-10.**  
 Oil of bergamot.....1-200, **1-400, 1-720.**  
 Solution. .... **1-1, 1-4, 1-5.**  
 Oil of capeput .....Growth in the emulsion.  
 Oil of cassia..... 1-3000, 1-4000, **1-5000\*.**  
 Solution..... 1-2, 1-3, 1-4, 1-8, **1-10\*.**  
 Oil of cinnamon (Ceylon)..... 1-2000, **1-2700\*, 1-4000.**  
 Solution. .... 1-1, 1-2, 1-3, **1-4\*, 1-5.**  
 Oil of cloves.... 1-1100, 1-1200, **1-2000.**  
 Solution..... 1-1, 1-2, **1-3\*, 1-4.**  
 Eugenol.....1-640, 1-800, **1-1200.**  
 Solution.....1-1, 1-2, 1-3, **1-4\*, 1-5.**  
 Oil of copaiba..... Growth in the emulsion.  
 Oil of coriander.....Growth in the emulsion.  
 Oil of cubebs.....Growth in the emulsion.  
 Oil of eucalyptus.....Growth in the emulsion.  
 Eucalypti extract .....1-100, **1-240, 1-480.**  
 Solution.....**1-1\*, 1-2 1-3, 1-4, 1-5.**  
 Eucalyptol ..... 1-100, 1-380, **1-650.**  
 Solution.....**1-1, 1-2, 1-3, 1-4, 1-5.**  
 Oil of fennel.....Growth in the emulsion.  
 Oil of mustard.....1-1000, 1-1500, **1-2000.**  
 Solution..... 1-1, 1-2, **1-4\*, 1-6, 1-10.**  
 Oil of pennyroyal.....1-480, 1-720, **1-960.**  
 Solution ..... **1-1, 1-2, 1-3, 1-4, 1-5.**  
 Oil of peppermint.....1-375, **1-600, 1-800.**  
 Solution.....**1-1, 1-2, 1-3, 1-4, 1-5.**  
 Menthol (sol.).....**1-1, 1-2, 1-3, 1-4, 1-5.**  
 Oil of sassafras.....1-270, 1-540, **1-800.**  
 Solution.....**1-1, 1-2, 1-3, 1-4, 1-5.**  
 Oil of thyme.....Growth in the emulsion.  
 Oil of turpentine (Merk's rec.) ....1-500, 1-600, **1-800.**  
 Solution.....1-1, **1-2\*, 1-3, 1-4, 1-5.**  
 Terebene.....**1-480\*, 1-800, 1-1400.**  
 Solution..... **1-1\*, 1-2, 1-3, 1-4, 1-5.**  
 Terpinol..... 1-520, 1-720, **1-960.**  
 Solution..... 1-1, 1-2, **1-3, 1-4, 1-5.**  
 Oil of valerian.....Growth in the emulsion.  
 Oil of wintergreen.....Growth in the emulsion.  
 Salicylic acid (sol.).....1-1, 1-2, **1-3\*, 1-4, 1-5.**  
 Oil of wormseed.....1-280, **1-720, 1-880.**  
 Solution..... **1-1, 1-2, 1-3, 1-4, 1-5.**

*Experimental Tests in Broth containing 5% of Egg Albumen.*

In the following tests three solutions of the bichloride of mercury were used. A 1-500 solution of bichloride of mercury was made and divided into three equal parts. That marked (p) was left plain. That marked (a) received 5% of hydrochloric acid. That marked (s) received 10% of chloride of sodium.

Solution (p).....	<b>1-5000, 1-7500, 1-10000, 1-15000.</b>
Solution (s) .....	<b>1-5000*, 1-7500*, 1-10000, 1-15000.</b>
Solution (a) .....	<b>1-5000*, 1-7500*, 1-10000, 1-15000.</b>
Solution (p).....	<b>1-1000, 1-2000**, 1-3000**, 1-4000*.</b>
Solution (s) .....	<b>1-1000, 1-2000***, 1-3000**, 1-4000*.</b>
Solution (a).....	<b>1-1000, 1-2000, 1-3000, 1-4000.</b>
Carbolic acid (5% sol )	<b>1-8, 1-10, 1-12, 1-15, 1-20.</b>
Oil of cassia (sol ).....	<b>1-3, 1-5, 1-8, 1-10*.</b>
Copper sulphate (sol)..	<b>1-100, 1-200, 1-400.</b>

*Discussion.*

Dr. C. M. Bailey said that since the day that the septic cause of disease was demonstrated, many agents said to be perfectly harmless and yet able to control the organisms which cause these diseases have been introduced. This paper has detailed experiments which reduce largely the number of these agents and give us a better knowledge of those which we can use. There is one fact which will help us to understand the action of some antiseptics: that is, that microbes cannot grow in healthy tissue, and if the system is restored to health the microbe will be driven out. This may explain the action of iodoform and some other drugs which fail to show experimentally any antiseptic value, but in practice do stop the formation of pus. The action may be owing to the therapeutic value of the drugs in restoring tone to the parts to which they are applied. Our experience proves to us that iodoform has this effect, and unless we find something less unpleasant which will do as well we should continue to use it. The oil of cassia may be the desired substitute. Experience in practice teaches the policy of the use of but few agents. We can understand the few; while if we used a wide range our practice would be more or less empirical.

He related a case of a lady with badly decayed central and lateral incisors. The roots were decayed nearly to the apex, and there was a fistulous opening through the gum. He treated it with iodoform in eucalyptus oil, and, putting the drill clear through the roots, injected the remedy into the abscess, and dressed the teeth with a pledget of cotton saturated with the preparation. The next day he cleaned out the fistula, removing some spiculæ of bone, and with a syringe forced the antiseptic through the apex of the roots, and, in the course of a few weeks filled the teeth. There had been no trouble since. Another case was that of a gentleman who wished

his worn-down central incisors fitted with gold crowns. The teeth were badly decayed, the pulps dead, the roots infected, and there were indications of abscess. He was absent for a few days. When he returned there was an opening over the root of one of the teeth, with discharge. He then syringed in aromatic sulphuric acid till it came through the opening, treated it further with eucalyptus oil, and in a few days finished the preparation of the roots and fitted the crowns, which have been worn since. These are clinical experiences, and show that eucalyptus oil and iodoform are effective, notwithstanding their failure in Dr. Black's experiments.

Dr. W. X. Sudduth thought that in the experiments the use of saliva as an infecting material was not as likely to give valuable results as the use of pure cultures of the microbes, as the cultures would always be the same and the saliva would vary. He advocated the use of tartaric acid in connection with bichloride of mercury for the purpose of preventing the formation of albuminates. While iodoform is not an antiseptic in itself, yet by the liberation of iodine it has antiseptic power, and is almost universally used by surgeons in the form of iodoform gauze. He spoke favorably of the silicbchloride of soda, which is not poisonous, as a disinfectant in the mouth.

Dr. Harlan said that while the experiments of Dr. Black show that many of the antiseptics we have relied upon are of no value, they open up a new and pleasanter field in the class of agents we deal with. He thought the essential oils have valuable properties long overlooked. The action of the vapor of volatile oils as antiseptics has hardly been touched upon, but this action is one of their most valuable attributes, the vapor being carried with certainty and kept in constant contact with all surfaces of the part exposed. In the case of pulpless teeth where the dentine is infected, these oils and their vapor will be carried to all parts of the dentine better than any other agent we can use. His idea of an antiseptic is rather different from that of Dr. Black. If the antiseptic merely inhibits the growth of the microbe, it may inhibit long enough to cause its death, and in such a case the result is really disinfection; and if this is accomplished it is just as well as though it were killed instantly.

Dr. J. H. Woolley advocated the use of heat as an antiseptic, and said he had been experimenting with it in devitalized teeth. He related the history of a blind abscess which he had treated for a long time with all well-known remedies. When he thought it was in condition to fill he introduced into the root a heated broach, having the heat continuous, hot enough to vaporize water, and after removing the broach he discovered a pungent odor. He worked with his heated broach for half an hour, and all odor ceased. He wanted to



know if the medicines used were effectual, or if there would have been trouble if the heat had not been applied. He has used heat for three years for disinfecting root-canals, and finds it more effective than anything else.

Dr. G. D. Sitherwood said the difficulty was to get an agent which was powerful enough to control the micro-organisms and which would not act as a poison in the tissues. He had used about all the remedies that Dr. Black mentions, but always came back to the volatile extract of eucalyptus, and is more successful with that than with any other.

Dr. Black quoted from the report of the American Board of Health that it had been found impossible to sterilize bouillon with less than one to one-hundredth of bichloride of mercury. It requires this strength to sterilize the contents of the pulp-chamber, but in positions where there is no albumen one to one thousand is sufficient. He told of a post-mortem which he had attended,—a case of ovariectomy,—where the cavity was found filled with stinking pus although the parts had been covered with iodoform. This substance is not an antiseptic, and the claim that it sets iodine free and thus becomes antiseptic is not true, for in such a case the color of the iodine would show. In regard to vaporizing essential oils and camphor, he had not studied it. Heat is one of the best disinfectants we have. He used the saliva from his own mouth in preference to the pure culture, because he was sure that the saliva of a person who kept his mouth in the same condition varied less than pure cultures would; the same microbes would always be present in such a mouth, and more surely in a natural condition than in the culture.

Dr. J. N. Crouse, by permission, called attention to the Dental Protective Association. He said it was necessary to act at once, and they must have money now to carry on the fight against the Tooth Crown Company.

Dr. McKellops said the dentists do not seem to understand the ground they stand on. In the cases already tried in the lower courts the company has beaten us on bridge business. We have beaten them on crown business, and both sides have appealed to the Supreme Court, and we must have the best legal advice and assistance or we will lose all. If the Tooth Crown Company should win, there is not a gentleman here who will not have a law-suit on his hands, and it is to your advantage to have the benefit of the protection of this association. It only costs ten dollars to join us, and we propose to fight the battles for all members.

(To be continued.)

## UNION CONVENTION OF THE FIFTH, SIXTH, SEVENTH, AND EIGHTH DISTRICT DENTAL SOCIETIES OF THE STATE OF NEW YORK.

(Continued from page 206.)

THIRD DAY—*Morning Session.*

PRESIDENT MASON, of the Fifth District Society, occupied the chair.

"Incidents of Office Practice" was called, and Dr. G. W. Melotte, Ithaca, mentioned the case of a girl fourteen years of age, with a badly decayed and broken tooth, and suffering from pericementitis, in which an effort was made to cleanse the root-canal for the purpose of saving the root with an idea of crowning. Not yielding to treatment, it was extracted and found to have an extremely large foramen, showing that death of the pulp took place before the root was fully developed and the foramen closed to its normal size, proving that no amount of treatment would have saved the root. The space was filled by bridging.

Dr. G. L. Curtis, Syracuse, said that with reference to root-filling he was opposed to taking two days or a week for treatment. He believes in the immediate method, as a rule. Perhaps the case mentioned by Dr. Melotte was one where it might have been well to defer filling for a time. In these cases of dead and putrescing pulps it is a good plan to perfectly cleanse the root-canal, in most cases using a disinfectant, for which purpose he prefers iodoform, and, as has been suggested, peroxide of hydrogen. By this course one gets the root in a few hours in as perfect condition as if it were treated for weeks. The next day he fills as perfectly as possible. In cases of abscess where there is no fistula, that is, in blind abscess, he goes through the gum to the apex with a bur, and then injects the sac with peroxide. He rarely has after-trouble, and he treats all his cases after the manner described.

Dr. Melotte replied that he thought Dr. Curtis's method correct.

Dr. F. W. Low, Buffalo, had had his attention attracted to the subject by a discussion at the meeting of the American Dental Association in 1887, where Dr. M. L. Rhein took issue with the old heads with reference to immediate root-filling, which he advocated. While every one of them discountenanced the method, they all said they had not tried it; Dr. Rhein said he had. The speaker had also tried it, and he presented the record of the first hundred cases of pulp-treatment in his practice since he had used the immediate method. It includes all classes of pulp-treatment, even that most difficult form of abscess where there is no fistula, and all the various classes of teeth, incisors, cuspids, bicuspid, and molars. After quoting the figures shown by the record and commenting upon them, Dr. Low

summed up his experience in the statement that ninety-seven per cent. of the cases which present can be successfully treated by the immediate method. The first essential to success is that the pulp-canal shall be cleansed perfectly. For this purpose he has used nothing else so satisfactorily as peroxide of hydrogen, followed by bichloride of mercury solution as a germicide. If there is a blind abscess the peroxide will penetrate it and cleanse it. If it will penetrate the tubules of the dentine, why not an abscess? In treating root-canals, it will go where no instrument will penetrate. One volume of the drug forms twelve volumes in combination with the pus gases. It is not only an antiseptic, but combining with the gases of putrefaction it swells and effervesces, thus driving out the pus. He believes that drilling through the alveolus in blind abscess is good practice. In one of his first cases, where he had subsequent trouble, the patient feeling, as he expressed it, as if there was a balloon inside his jaw, he took a spear-pointed drill, wiped a spot on the gum with carbolic acid to benumb the surface, and then drilled in. The patient said he did not suffer any pain. The three essentials to success are, first, to cleanse or disinfect the canal and the tooth thoroughly; second, to get the canal perfectly dry with hot air followed by shreds of absorbent cotton wound on very fine broaches; and third, to perfectly close the canal.

Dr. Melotte had tried the carbolic acid in the manner referred to by Dr. Low, and it was a perfect success.

Dr. G. L. Curtis. One of the most important points mentioned by Dr. Low is the necessity of drying the canal thoroughly. The speaker believes that moisture is the cause of many abscesses, and therefore in the treatment of root-canals we must have perfect dryness. He prefers the canal points of Dr. Darby, or something else as fine, as we must penetrate as far as possible into the root. Then with the hot-air syringe he drives the hot air in until perfect dryness is secured. For filling the canal he uses chlora-percha, so as to be sure to force it to the end of the root. The method is somewhat difficult in the superior teeth, but it only requires a little more pains on the part of the operator. He uses the rubber-dam and never allows the fluids of the mouth to enter the canal, as he believes they carry up destructive agents. After filling the canal partially with the chloroform solution, he takes gutta-percha points, such as are prepared and sold, and drives them up.

Dr. W. I. Southerton, Syracuse, who finds trouble in treating the buccal roots of the superior molars, wished to ask Dr. Low if he had any special way of opening these roots.

Dr. Low replied that he had said that peroxide of hydrogen would go where we could not go with the best instruments yet



devised for entering root-canals. The only thing to be done in the roots mentioned by Dr. Southerton is to open up and clean as thoroughly as possible with instruments, and then inject the peroxide to complete the work of cleansing. He believes, too, that the chlora-percha, after it is dissolved, will also reach points inaccessible to instrument points. Anyway, we have to take chances with crooked roots. The rubber-dam is a necessity in these cases. One trouble with the old operations was that with the long-continued treatment the bacteria of the oral cavity were allowed to get back into the canal to keep up the irritation.

Dr. G. V. N. Relyea, Oswego, had had several very trying cases within the past few days, in one of which there was a discharge of pus from a point over the left superior lateral and cuspid. It had been discharging in this way for years, so the patient informed him. He treated it for three days with aromatic sulphuric acid, full strength, and thought he had succeeded in curing the abscess, but the patient returned in a few days and there was again a slight discharge.

Dr. Barber had a case in which there was a fistula back by the wisdom-tooth, and another situated immediately opposite. He could not get through the foramen with nerve-bristles, and he felt that he must get through at least once. For several weeks, at least twice a week, he treated the canal with hydrochloric acid worked down with the bristles, gradually gaining the point he was aiming at. On getting through the root, after one good, thorough treatment with carbolic acid he filled the canal, which has since given no further trouble.

Dr. Relyea related a case where a lady came to him with a lateral incisor discolored, which he advised should be taken out, treated, and returned to its socket. On extracting the tooth he found a half-inch of a drill in it running to the apex. Here was an unlooked-for complication, but he removed the drill and returned the tooth after treatment. Adhesion was perfect in ten days, but the tooth was so badly discolored by the long stay of the drill-point that he was finally compelled to remove it.

Dr. C. F. Rich, Saratoga, supposed that all dentists used Donaldson's nerve-bristles, but he wanted to suggest something which he had used in cleaning root-canals with great satisfaction, and that was simply quill toothpick. We all have a horror of breaking drills in teeth, and all danger of this character can be averted by using the quill, which is one of the finest agents for the purpose, and it is almost impossible to break it. It can be cut down as fine as necessary, and if it is desired to carry cotton on it, it can be barbed. It can be used in any tooth that is open.

Dr. Melotte, in opening the subject of "Porcelain Tips," said that in the *Universal Medical Annual*, vol. iii, p. 514, was an article by Prof. J. Bond Littig, of New York, entitled, "Porcelain Tips for Broken Front Teeth having Living Pulp," which was well worth perusal, but which he feared would be seen by comparatively few dentists because of its not being connected with the general line of dental literature. It presents two methods which are practical, the second of which he has tried in a case of abraded teeth, restoring two centrals and one cuspid. The pulps were alive, but there was no great difficulty in making retaining-grooves. The operation was very successful, giving the patient, a lady of about fifty-five, much satisfaction in getting rid of the unsightliness of gold contours and with greater promise of permanence.

His next case was for a young lady of sixteen: cuspid undeveloped and corrugated as is usual in cases of atrophy; otherwise healthy. To avoid exposing the pulp and to obtain firm anchorage he resorted to the following method: The end of the root was ground off smooth, and a circular groove one-sixteenth inch in depth was made with a trephine of the same diameter. This caused only slight pain, the trephine being rotated by hand, which is safer than the engine. A cross-pin tooth was selected of a thickness a little more than the length of restoration required; the pin surface of the tooth flat, and the distance apart of the pins equal to the diameter of the groove. A platinum tube, a trifle less in length than the depth of the groove and of the same diameter as the trephine, was then formed of No. 29 plate on a mandrel, and soldered with pure gold. Two slots were cut with a separating file in the tube to receive the pins, after which the tube was waxed and placed, invested, carefully heated, and attachment made with gold solder. After cooling, the tube was placed in position, and with fine pumice-stone and water a perfect joint made by carefully rotating the tooth, after which it was removed and the overhanging portions ground away until it was found to be nearly the size and shape required. The rubber-dam was then applied, and the groove and surfaces of the tooth made clean and dry. Notches were cut in the end of the tube with the separating file for the ready displacement of the excess of cement as well as to secure firmer anchorage. A creamy paste of zinc phosphate was placed in the groove and around the tooth. The tip was put in place and firmly rotated until the excess of cement was forced out, forming a close joint. After the cement became hard the finishing was done with fine corundum wheels, cork, and pumice. This device has given the patient great satisfaction, and adds not only another method of tipping teeth having live pulps, but suggests a means of attaching a part or the whole of an anterior porcelain crown.

Dr. S. E. McDougall, Clinton, said he had a boy under his care with an incisor broken off; the dentine was extremely sensitive. Would Dr. Melotte recommend the method he has described for that case?

Dr. Melotte would not advise a tip where dentine is too sensitive to admit of making a proper retaining-groove or anchorage. Another advantage of the method he had described over crowning is that so much of the sound dentine is saved. He would also suggest the making of teeth with three pins having heads to come in the line of the groove made with the trephine, which would save the trouble of making a tubular anchorage.

Dr. George Archbold, Phoenix, read a paper entitled "Chemistry an Important Factor in Dental Education," an abstract of which follows:

Chemistry has placed so much at the disposal of the physician as well as the dental surgeon that a knowledge of the science cannot but help him in his professional studies. Medical and dental students should receive as sound and extensive a foundation in the theory and practice of chemical science as their time and abilities will admit. For the medical student he would recommend a thorough knowledge of the principles of chemical philosophy and the laws of chemical action; and what is true of medical education is equally true of dental training. Physiological experimentation with drugs introduced directly into the circulatory system of animals is not always borne out in their administration in the usual way, because they are dissolved in the stomach and new and entirely different compounds are formed. A knowledge of the laws of chemical action directs the prescription of compounds which when taken into the stomach break up into those which have the exact properties desired. Thus, to get the medicinal effects of sulphuric acid he would administer resorcin, which would be decomposed, forming that acid.

In dentistry the student is in the midst of natural chemical work, and a wide field is open for extended research. Chemistry has shown that enamel and dentine are composed of the same substances, mainly phosphate of lime, the principal difference being in physical structure. By extended study of this difference the scientific dentist will be able to arrest decay and deposit an enamel in cavities of decay equal to that of nature. The art of metallurgy is essential to the dentist, and here a knowledge of the general principles of chemical philosophy becomes an important factor of his education.

Dr. Archbold then entered into a discussion of chemical force and the principles of chemical combination, in which as an illustration



he referred to the process of vulcanizing rubber, showing how different results may be obtained by using different forms of chloride of sulphur.

[It was Dr. Archbold's intention to illustrate his paper with a series of practical experiments, but the non-arrival of the necessary apparatus prevented the carrying out of this part of the programme.]

Dr. Barrett could not say anything definite because of the intricacy of the subject. To speak accurately upon chemistry one must practically first learn a new language, to understand the symbols used. There is no limit to chemical combinations, and almost no limit to their symbolical representation. It afforded him great satisfaction to hear such a paper as this of Dr. Archbold's read before a dental society with the apparent understanding or comprehension of those who listened to it. It requires constant study to keep pace with the progress of chemistry. Crystallization is so interwoven with chemistry, that dentists should have some knowledge of the laws which dominate chemical combinations. It is not uncommon for prescriptions to be given by physicians in which one element completely neutralizes another. The allotropic forms of sulphur will assume, under crystallization, forms utterly incompatible with one another. The writer of the paper has referred to vulcanization, which essentially belongs to chemistry. Goodyear was a long time devising a way to make caoutchouc useful in the arts; but he finally achieved it by adding other elements and subjecting the compound to a certain degree of heat, which changed its character completely. There is a certain temperature at which vulcanization will be perfect; below that point it will not be perfect; above it cannot be. Yet dentists vulcanize rubber for artificial plates all the way from 285° to 350° F. Dentists sometimes say that the rubber they get to-day is not so good as it used to be. The reason for the poorer character of the rubber is probably the fact that they used to take two or three hours to vulcanize it at a low heat, and now they put it through in a much shorter time at a higher temperature,—actually burn it. Dentists should certainly know the general laws of this combination. The changes are so intricate that they cannot hope to know it all, but they should have some knowledge of the general principles underlying it. Even in vulcanization it behooves us to work according to definite principles. It is no exaggeration to say that chemistry is the foundation-stone of physical science. The very bread baked by the housewife requires a knowledge of chemistry. The dentist cannot make a gold plate or solder a backing without some knowledge of chemical science.

Dr. M. D. Jewell, Richfield Springs, thought the subject of chemistry second in interest only to histology. As illustrating the idea

suggested by Dr. Barrett as to the necessity of a knowledge of chemistry when one prescribes for disease, he mentioned an incident which had come to his knowledge where a prescription containing bromide of potassium, bromide of ammonium, and bicarbonate of sodium was ordered. No reaction was noticed, and as the patient was going away, the idea was to have enough of the medicine to last till his return. The moment the bottle was opened a strong odor of ammonia was apparent, and on investigation it was found that by chemical reaction the bicarbonate of sodium had decomposed the bromide of ammonium and produced carbonate of ammonium and bromide of sodium.

The subject was passed, and "Dentistry in its Relation to Medicine" was called.

Dr. Barrett, in the absence of Dr. H. D. Didama, of Syracuse, who was to have opened the subject, said that dentistry and medicine were related in so far as they were one. He was not much worried about the status of dentistry. That is a matter which must settle itself. If a cross-roads dentist insists on being called "doctor," and is offended if the title is not given him, it does not raise his status in the scientific world. All the talk about dentists being *per se* the most scientific and progressive body of men in the universe is "tip-top blue blossom" nonsense. We are just what we make ourselves, and all the resolutions that can be passed will not alter our status. We may claim equality with medical men, and out of courtesy the equality may be conceded. If a dentist is a medical man he is that and nothing else; but whether he is a medical man or not depends upon what kind of a dentist he is. If he practices therapeutically he is a medical man; if his business is merely the extracting of teeth and the putting in of rubber substitutes, he is not. A man may commence at the bottom and take the degree in medicine or dentistry, or he may commence with nothing and make himself what he desires to be or should be. Dr. Palmer's experience was a common one among the older practitioners of dentistry. He began practice without any degree, when dentistry was at a low ebb, but if he and those who, like him, have progressed beyond their beginnings are not practicing according to therapeutic laws, the speaker does not know what the term means. They are practicing a specialty of medicine; but *in* medicine,—no, sir. There is only one acknowledged door by which one may enter the medical ranks, and that is by the degree M.D. A man cannot be accepted as a medical man without taking the medical degree. This may not be a palatable statement, but it is a fact. We have a right to boast of the progress of dentistry in the past few years. When he looks at the pit from

which dentistry was dug and sees where dentists now stand, he is ready to say that they are making more rapid advances than almost any other professional men. This is in part due to the very low place from whence they sprung; but to-day dentistry has changed so much from what it was that the dentists are becoming scientific men. They will, however, rank as individuals, and as a class, just where they place themselves. In this view comes home the necessity of the study of scientific knowledge. There is wisdom on every hand neglected. Every dentist should study at all times. He can thus elevate himself and lift up his profession.

Dr. S. B. Palmer, Syracuse, while acknowledging the compliment paid him by Dr. Barrett, could scarcely describe how he suffered when the matter of prescribing medicines for patients was mentioned. In this respect he was not what he should be. No dentist is fully a dentist to-day who has not an M.D. degree. He knows that the great mass of them could render better service if it were not necessary to send their patients to the physician when constitutional treatment was indicated.

Dr. Barrett. The M.D. degree does not make a doctor, but it does admit a man to the ranks. He commends the degree for the knowledge which it represents. It means that the man who possesses it has had the opportunity to learn the medical sciences. Whether he has learned them is a different matter.

Dr. C. T. Howard, Rochester, read a paper entitled "The Facial Angle in Relation to the Construction of Artificial Dentures," the essential points of which were as follows:

Last April I read a paper on this topic before the Seventh District Dental Society. At that time there was very little of value to present; but the subject so interested the members that they passed a motion requesting me to extend my investigations and present the results at the semi-annual meeting. But the Fifth District Society thought proper to change the course of the plans of the Seventh, and thus it is that this paper comes to be presented to this convention.

My purpose is to determine the relative position that the plane of the ends of the upper teeth, that are in sight when laughing, should occupy, and what parts of the face can be used as guides in determining the position.

In making a full artificial denture one is often puzzled to know just where the division between the upper and lower teeth should come. It is usually settled by noting the parting line of the lips and how the teeth show when the lips are separated. This indicates the length of the incisors. How shall one determine the length of

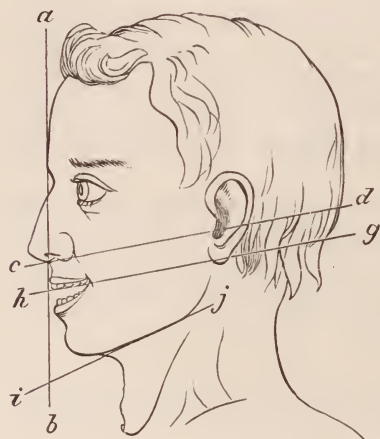


the other teeth under consideration,—that is, those back to and including the first molars? Should they show more, just the same, or less than the incisors, when the lips are separated in laughing?

With these questions before me I have often asked myself what should be the direction of the line of separation of the teeth as it passes backwards, or in other words what position should the plane of the ends of the upper teeth occupy?

The ends of all the teeth are not normally in a plane, but on a line curving up as it passes backwards. But this line is only slightly curved forward of the first molars. It follows, that a plane touching the ends of the incisors and first molars fairly represents the line of the ends of the teeth that show; see in the figure the line *h, g*. This is the one I have adopted and have named the dental plane.

I at first resorted to sighting along the ends of the teeth of persons coming under my care who possessed good natural dentures. I then adopted the plan of placing the handle of an instrument on the ends of the first molars and central incisors, to secure greater accuracy in sighting. By this arrangement one can stand at the side of a person and see where the extended dental plane will pass,



and note the relation it bears to various parts of the face and head.

From observations made in this way I was led to adopt, in most cases, the lower end of the lobe of the ear as a point to or near which the extended dental plane should pass; *h, g*. Finding that the lobe of the ear was so nearly intersected by an extension of the dental plane, and knowing that the opening of the ear was one of the points used in determining the facial angle, it became quite evident that the dental plane must bear some relation to the facial angle as adopted by Camper. The facial angle (Camper's) *a, c, d* is formed by a line *a, b*, touching on the median line the most prominent parts of the face, and a line *c, d*, drawn from the external opening of the ear to the first line at the floor of the nostrils or base of the nose.

On further examination we find this supposition to be correct to an approximate degree. The relation is much closer than appears at first thought. There is a certain semblance of parallelism between the second line, *c, d*, of the facial angle and the dental plane *h, g*.

That is, the dental plane is nearly parallel with a line drawn from the base of the nose to the external opening of the ear. This is shown in the figure, which represents a side view of a head with the mouth open and the corners drawn back to expose a part of the first molar. The scheme proves a convenient, available, and practical means of determining the position of the dental plane. It is subject to some variations. Faces and heads differ so much in other respects that one could not expect to find the dental plane always sustaining exactly the same relation to the second line of the facial angle. But by studying faces in the ways already indicated, a knowledge of the various conditions is soon acquired, and with it comes the ability to locate quite accurately the position of the dental plane in any given case.

With the object of determining the exact relation in the same person and the extent of variation in different persons, I have adopted a plan by which it can be measured.

First measure the facial angle  $a, c, d$ . Then measure the angle that the dental plane sustains to the face line of the facial angle, or the angle  $a, h, g$ . This angle I have named the dento-facial angle. As the face line is common to both angles, the difference in degrees of the two angles is the degree of variation from parallel of the dental plane and the second line of the facial angle. Thus in the figure the facial angle is seventy-eight degrees, the dento-facial angle is seventy-seven degrees, giving a difference of one degree as the variation from parallelism of the dental plane and the second line of the facial angle.

In my investigations of the subject it appears that there are several modifying factors.

One is that the relation between the facial and the dento-facial angles is somewhat dependent upon the form and size of the lower jaw. In view of this I have adopted the plan of measuring the angle which the line of the lower edge of the inferior maxilla,  $i, j$ , sustains to the face line of the facial angle when the mouth is closed. This I have named the maxillo-facial angle,  $a, i, j$ . In this way there are obtained three measurements of prominent and important parts, from a common base.

I present a table of the measurements of the three angles from sixteen skulls, nearly all of which had complete dentures. They were taken at Ward's Natural Science establishment in Rochester, N. Y. They are from skulls of persons from twenty-two to about fifty-five years of age, and of several nationalities. In these measurements the second line of the facial angle extended from the point of the anterior nasal spine to the lower side of the meatus auditorius externus, at a depth where the opening is rather small.

	Facial Angle.	Difference.	Dento- Facial Angle.	Difference.	Maxillo- Facial Angle.	Difference bet. Facial and Maxillo- Facial Angles
1	85°	8°	77°	12°	65	20
2	82	1	81	18	63	19
3	80	6	74	11	63	17
4	78	1	77	15	62	16
5	77	0	77	11	66	11
6	75	0	75	12	63	12
7	74	4	70	5	65	9
8	73	0	73	16	57	16
9	71	1	70	10	60	11
10	76	11	87	19	68	8
11	75	7	82	17	65	10
12	75	6	81	16	65	10
13	73	4	77	18	59	14
14	73	9	82	12	70	3
15	70	8	78	10	68	2
16	76	8	84	4	80	4

The above table, in which fractions of a degree are not given, is arranged in three groups, each group according to the measurement of the facial angle. The first group, Nos. 1-9, includes those in which the facial angle is largest. The second group, that of Nos. 10-15, includes those in which the dento-facial angle is largest, and No. 16, the only case I have thus far found in which the maxillo-facial angle is largest. In this case the incisors were considerably worn.

No classification according to age, nationality, or other modifying conditions is here attempted. The number of observations made is not sufficiently large to admit of definite conclusions.

The measurements have not been extended to living people in numbers sufficient to enable me now to do more than say that those given here are an indication of what may be expected.

This paper is but an opening chapter, yet it points out in some degree what part the facial angle should sustain as a guide in the construction of artificial dentures.

Dr. Barrett. That is scientific work of the kind that dentists should be at. It is such work as this that gives dentists standing in the scientific world and lifts dentistry to the level of the learned professions. These measurements of Dr. Howard's show why sometimes the insertion of artificial dentures changes the appearance of the patient so much as to have an almost grotesque effect.

Further discussion of the subject was postponed temporarily.

Dr. W. H. Dwinelle, New York, read an interesting reminiscent paper, in which he called attention to the fact that within a few miles of Syracuse, on Pompey Hill, Dr. Chapin A. Harris, the founder



of the first college of dental surgery, was born; in an adjoining county Dr. Amos Westcott first saw the light, and the writer himself took his first lessons in dentistry in Syracuse. Drs. Abbott and Brockway first began their professional careers so near that they, too, can claim it as their "stamping ground." Passing to the object of the gathering, the writer enforced eloquently the benefits of association.

Dr. H. A. Birdsall, Buffalo, read a paper on "Ethics."\*

Adjourned till 2 o'clock P.M.

(To be continued.)

### MISSISSIPPI DENTAL ASSOCIATION.

THE annual meeting of the Mississippi Dental Association will be held at Vicksburg, Miss., commencing on Tuesday, May 21, 1889.

E. E. SPINKS, *Cor. Secretary*,  
Meridian, Miss.

### NEBRASKA STATE DENTAL SOCIETY.

THE tenth annual meeting of the Nebraska State Dental Society will be held in Wahoo, on the third Tuesday in May, 1889, continuing three days.

From the present outlook this promises to be the best meeting in the history of the society. Several men of prominence in the profession from abroad will be with us.

J. J. WILLEY, *Cor. Secretary*,  
Wahoo, Neb.

### KANSAS STATE DENTAL ASSOCIATION.

THE Kansas State Dental Association will hold its next annual meeting at Topeka, Kansas, commencing on Tuesday, April 30, 1889, and continuing four days.

C. B. GUNN, *Secretary*,  
Leavenworth, Kan.

### AMERICAN MEDICAL ASSOCIATION.

THE American Medical Association will hold its fortieth annual meeting at Newport, R. I., June 25, 26, 27, and 28, 1889. Intending exhibitors should address Dr. Chas. A. Brackett, Newport, R. I., chairman sub-committee upon exhibits.

HORATIO R. STORER, M.D.,  
*Chairman Committee of Arrangements.*

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\* See DENTAL COSMOS, February, 1889, page 109.

## DENTAL COLLEGE COMMENCEMENTS.

### BALTIMORE COLLEGE OF DENTAL SURGERY.

THE forty-ninth annual commencement of the Baltimore College of Dental Surgery was held at the Lyceum Theater, Baltimore, Md., on Friday, March 15, 1889, at 8 o'clock P.M.

The annual oration was delivered by J. N. McCormick, and the valedictory by C. L. Morey, D.D.S.

The number of matriculates for the session was one hundred and eighteen.

The degree of D.D.S. was conferred on the following graduates by Professor R. B. Winder, dean of the faculty:

NAME.	STATE OR COUNTRY.	NAME.	STATE OR COUNTRY.
G. E. Adams.....	New Jersey.	W. H. Lockwood.....	Wisconsin.
J. E. Armitage.....	New York.	J. H. Minard.....	Ontario.
L. P. Brown.....	New York.	F. H. Moore.....	Maine.
E. E. Butler.....	Virginia.	C. L. Morey.....	Texas.
P. C. Carmichael.....	New York.	E. E. Murray.....	North Carolina.
G. R. Carter.....	Virginia.	J. F. McArthur.....	Dakota.
G. E. Coughlin.....	Indiana.	T. S. McElfish.....	Maryland.
George B. Dorsey.....	Mississippi.	J. P. Nesbitt.....	Ohio.
A. R. Eaton.....	New Jersey.	O. M. Nisley.....	Indiana.
F. C. Exley.....	Georgia.	J. N. Penberthy.....	Minnesota.
N. L. Hale.....	Alabama.	E. G. Powers.....	Minnesota.
W. E. Hanah.....	Pennsylvania.	J. G. Robinson, Jr.....	Maryland.
J. Hardy.....	Virginia.	F. Rothenbach.....	Germany.
H. L. Harlan.....	Kentucky.	G. B. Rush.....	Virginia.
L. F. Hough.....	Virginia.	H. L. Sumption.....	Virginia.
G. W. S. Ireland.....	Maryland.	W. R. Spencer.....	Virginia.
W. D. James.....	Minnesota.	W. E. Walker.....	Mississippi.
B. B. Johnston.....	Dist. of Columbia.	J. R. Watson.....	Pennsylvania.
A. L. Jones.....	Virginia.	D. Williams.....	North Carolina.
W. C. Klatte.....	South Carolina.	J. P. Whedbee.....	Virginia.
A. Kraus.....	Roumania.	C. Whitney.....	Dist. of Columbia.
N. B. Larkin.....	Tennessee.	A. C. Whitehead.....	Virginia.

### OHIO COLLEGE OF DENTAL SURGERY.

THE forty-third annual commencement of the Ohio College of Dental Surgery (Department of Dentistry, University of Cincinnati) was held at College Hall, Cincinnati, Ohio, on Monday, March 4, 1889.

The annual address was delivered by E. D. Warfield, Esq., and the class oration by H. M. Patton, D.D.S.

The number of matriculates for the session was one hundred and fifty.

The degree of D.D.S. was conferred on the following graduates by C. R. Taft, D.D.S., vice-president of the board of trustees:

NAME.	STATE.
Frank Archer Ayer.....	Ohio.
David William Barrow.....	Ohio.
Oscar L. Beard.....	Ohio.
Harry Clifton Blethrow.....	Pennsylvania.
Phares S. Bollinger.....	Ohio.
William T. Born.....	Ohio.
Ralph R. Braxtan.....	Indiana.
James T. Bristow.....	Michigan.
Asbury Ross Bryte.....	Pennsylvania.
Alva Matthews Bush.....	Ohio.
Clare Otis Carr.....	Ohio.
Frank L. Cary.....	Ohio.
Ben Carter Chandler.....	Kentucky.
William H. Cole.....	Ohio.
Guss B. Cooper.....	Kentucky.
Alamander N. Copsey.....	California.
Charlie Henry Crigler.....	Kentucky.
Joseph M. Cunningham.....	New York.
William W. Dickey.....	Mississippi.
Felix William Doran.....	Iowa.
Benjamin F. Erb.....	Iowa.
George W. Gandee.....	Ohio.
William Henry Gillett.....	Ohio.
Robert Lee Gray.....	Ohio.
Charles Henry Griffin.....	Ohio.
Melville McH. Haas.....	Indiana.
Horace Edwin Hatton.....	Ohio.
Robert H. Hodgen.....	Kentucky.
Aurdy Julian Holmes.....	Ohio.
Theophilus F. Hover.....	Pennsylvania.
William Oliver Hulick.....	Ohio.
Thomas O. Humphreys.....	Kentucky.
Harry Jenkins.....	Ohio.

NAME.	STATE.
Nathan Kelly.....	Illinois.
Edwin Franklin Keran.....	Minnesota.
Josiah R. King.....	Pennsylvania.
Will Clarence Lupfer.....	Ohio.
Herbert L. Madison.....	Iowa.
George Erwin Mann.....	Ohio.
Edwin Clark Maxwell.....	Michigan.
William T. McLean.....	Canada.
Mrs. Lucy D. Montz.....	Kentucky.
Edwin H. Moss.....	Missouri.
Henry Mathiot Patton.....	Ohio.
Fred B. Pittwood.....	Illinois.
Eber Reynolds.....	Ohio.
Christopher C. Ritter.....	Indiana.
Carl Ritz.....	Ohio.
James E. Rothenbush.....	Ohio.
W. H. Sedgwick, Jr.....	Ohio.
Horatio Clay Sexton.....	Indiana.
Edward G. Snodgrass.....	Ohio.
Elmer S. Snyder.....	Iowa.
Jarome Walter Sparks.....	Indiana.
Andrew L. Sprague.....	Ohio.
Daniel H. Sullivan.....	Ohio.
Frank Berry Taylor.....	Kentucky.
Richard Taft Taylor.....	Ohio.
Horace M. Thomson.....	Kentucky.
Warren H. Upton.....	Iowa.
Lewis W. Watts.....	Ohio.
Arthur Jewell Weaver.....	Ohio.
Waitman A. Williams.....	Ohio.
Walter T. Withoff.....	Ohio.
George B. Wortman.....	Ohio.

### MISSOURI DENTAL COLLEGE.

THE twenty-third annual commencement of the Missouri Dental College was held, in connection with that of the St. Louis Medical College, at Memorial Hall, St. Louis, Mo., on Thursday, March 14, 1889, at 7.30 P.M.

The valedictory address was delivered by Prof. J. M. Scott, M.D.

The number of matriculates for the session was fifty.

The degree of D.D.S. was conferred on the following graduates by Prof. H. H. Mudd, M.D., dean of the faculty:

NAME.	STATE OR COUNTRY.	NAME.	STATE OR COUNTRY.
Henry Allen Bragg.....	Missouri.	Eugene Beauharinas Neal.....	Missouri.
Jonathan Otis Eppright.....	Missouri.	Alexander Stark Oliver.....	Montana.
John Thomas Fry.....	Missouri.	Geo. Harry Pipino, M.D.....	Illinois.
Charles Leroy Hickman.....	Missouri.	Julius Peter Ruge, M.D.....	Missouri.
Philip Frank Hellmuth.....	Illinois.	Henry Ruutz.....	Switzerland.
William Worwick Holmes.....	Illinois.	Edward A. F. Wulze.....	Missouri.
Harry Taylor Hyams.....	Louisiana.	Frederick Edward Weber.....	Switzerland.
Gilbert Wesley Jarvis.....	Missouri.	Joseph Henry Wilson.....	Missouri.
DeCoursey Bradley Lindsley.....	Missouri.	Adrien Zinsstag.....	Switzerland.

The honorary degree of D.D.S. was conferred on Charles Rudolph Edward Koch, of Chicago, Ill.



## PENNSYLVANIA COLLEGE OF DENTAL SURGERY.

THE thirty-third annual commencement of the Pennsylvania College of Dental Surgery was held at the American Academy of Music, Philadelphia, on Friday, March 1, 1889, at 8 P.M.

The annual address was delivered by Professor Henry Leffmann, M.D., D.D.S.

The number of matriculates for the session was one hundred and seventy-eight.

The degree of D.D.S. was conferred on the following graduates by S. W. Gross, M.D., president of the board of trustees:

NAME.	STATE OR COUNTRY.	NAME.	STATE OR COUNTRY.
Ambrose M. Allen.....	Pennsylvania.	N. H. Keyser.....	Pennsylvania.
Ismael Angulo.....	South America.	Harvey Chambers King.....	Pennsylvania.
Clarence E. Bachman.....	Minnesota.	John R. Lane.....	Pennsylvania.
William C. Bailey.....	New York.	Chauncey G. Lewis.....	Ohio.
Alois Binotsch.....	Germany.	Elmer Clinton Lockard.....	New Jersey.
Scipio Bond.....	Minnesota.	J. Dayton Lowrey.....	Pennsylvania.
C. Walter Borgner.....	Pennsylvania.	Ernestine A. Mergler.....	Illinois.
Frederick R. Brunet.....	Cuba.	John V. Mershon.....	Pennsylvania.
Ramon Campuzano.....	Cuba.	George Edwin Messick.....	Delaware.
Julia May Carmen.....	New York.	W. M. Molyneaux.....	Pennsylvania.
Geo. W. Chamberlain.....	New Jersey.	Julio Moncada.....	South America.
George M. Clark.....	New York.	Robert E. Morrison.....	Kentucky.
Arthur Perry Clarke.....	New York.	A. Fergus McBurney.....	Pennsylvania.
Edw. Moberg Cooper.....	Pennsylvania.	Thomas McCullough.....	Canada.
Wm. M. G. Corrie, Ph. G.....	Pennsylvania.	Kenneth McDougall.....	Pennsylvania.
Edgar E. Culbert, L. D. S.....	Canada.	Bert. V. Needham.....	New York.
E. C. Dean.....	Canada.	Frank Culver Pague.....	California.
James L. Diven, Jr.....	Pennsylvania.	Wilbur L. Pepper.....	Pennsylvania.
J. Adams Dyer.....	Canada.	Robert S. Ramsey.....	Canada.
R. W. Edwards.....	New Jersey.	John J. Reardon.....	New York.
Leon A. Efron.....	Russia.	Albin C. Rosenquist.....	Minnesota.
Milton Randolph Fisher.....	Louisiana.	David A. Rosenthal.....	Russia.
Gertrude M. Flies.....	New York.	Const'no Eudoro Sal-	
Lynn J. Gale.....	New York.	cedo.....	South America.
Clarke M. George.....	Ohio.	Ignacio H. Santamaria.....	South America.
Frederick Tho. Gibson.....	Canada.	Fried Schlapp, M. C. D.....	Germany.
Albert H. Goodrich.....	Minnesota.	C. Calvin G. Schomo.....	Pennsylvania.
George N. Griswold.....	New York.	Martha Schroeder.....	Germany.
William E. Grover.....	Pennsylvania.	John H. Shaw.....	Pennsylvania.
G. A. Guile.....	New York.	Matthew A. Smith.....	New Jersey.
Wm P. Gummer.....	California.	William H. Snyder.....	Pennsylvania.
Zelopheard Hand.....	New Jersey.	Richard S. Starkey.....	Canada.
Arthur H. Hanington.....	Canada.	F. Albert Stanger.....	New Jersey.
Edgar Harding.....	Pennsylvania.	John C. Stites.....	Delaware.
F. Kramer Heazleton.....	New Jersey.	William Lincoln Straw.....	Pennsylvania.
Henry C. Heyer.....	Illinois.	Tomosabro C. Suganuma.....	Japan.
Elmer Ellsworth Hill.....	Massachusetts.	Wm. Rutherford Sutch.....	Pennsylvania.
Fannie E. Hoopes.....	Maryland.	Edward C. Truesdell.....	Minnesota.
James Homer Hope.....	Pennsylvania.	Albert B. Van Osten.....	West Virginia.
Freed A. Hoyt.....	Minnesota.	Monroe L. Vansant, M. D.....	Pennsylvania.
W. Edwin Jackson.....	Pennsylvania.	D. Porter Vincent.....	Pennsylvania.
E. M. Johnson.....	Minnesota.	Heinrich Volkmer.....	Germany.
O. Herschel Johnson.....	Pennsylvania.	W. W. Walker.....	Minnesota.
Abner Jones.....	Ohio.	Geo. C. Watson.....	Pennsylvania.
David Griffith Jones.....	New York.	Irvin Norris Wells.....	Georgia.
Harry Davis Jones.....	Ohio.	Frank R. Zahniser.....	Pennsylvania.

## PHILADELPHIA DENTAL COLLEGE.

THE twenty-sixth annual commencement of the Philadelphia Dental College was held at the American Academy of Music, Philadelphia, on Thursday, February 28, 1889, at 8 P.M.

The address to the graduates was delivered by Professor S. B. Howell, M.D., D.D.S., and the valedictory by James G. Whiting, D.D.S.

The number of matriculates for the session was two hundred and twenty-six. The degree of D.D.S. was conferred on the following graduates by the president of the board of trustees:

NAME.	STATE OR COUNTRY.	NAME.	STATE OR COUNTRY.
Carlos Agnese.....	Brazil.	Harvey C. Johnson.....	Pennsylvania.
F. A. y Rodriguez, Ph.B.	Spain.	G. Cleland Jones.....	Delaware.
Mary M. Apgar.....	Dist. Columbia.	James W. Joslyn.....	New Jersey.
Hester J. Baker.....	Illinois.	Albert Kath.....	Germany.
W. Egbert Barnes.....	Italy.	Eugene L. Keen .....	Pennsylvania.
George W. Bates.....	Maine.	J. Edward Kelley.....	Ohio.
William W. Belcher....	New York.	Arthur H. Kunze.....	Germany.
George R. Bell.....	Pennsylvania.	Anna K. Lettenmeier...	Pennsylvania.
Percy Bennett.....	Australia.	George R. Martin.....	Canada.
Harry W. Bertholf.....	New Jersey.	William R. Mills.....	New York.
Horace Betts.....	Delaware.	Leslie D. Mitchell.....	New Jersey.
John H. Botz.....	Canada.	Richard D. McCaskey...	Pennsylvania.
Peter C. Boulo.....	Alabama.	Herbert V. McCormick...	New Jersey.
Camille Bourgeois.....	Louisiana.	Edgar W. McFarland...	Missouri.
Demosthenes Brush.....	New York.	A. Frederick Olmstead...	New York.
Rubens S. Bustos.....	Chili.	John D. Powell.....	California.
Fred. J. Capon, L.D.S.	Canada.	Charles R. Pullen.....	Canada.
George R. Churchill....	Pennsylvania.	George I. Robb.....	Canada.
William A. Clymer.....	Minnesota.	William S. Rosenthal...	Pennsylvania.
Joseph P. Collins.....	Canada.	D. B. Saxton.....	Pennsylvania.
J. Charles Combe.....	Rhode Island.	Richard Schmidt.....	Pennsylvania.
F. Emanuel Doering....	Canada.	H. Hugo Schurig.....	Germany.
Joseph E. Duffield.....	New Jersey.	Cyrus U. Smith.....	Kansas.
George E. Ellerbeck.....	Utah.	S. C. Snyder.....	Illinois.
Harold B. Findley.....	Canada.	William A. Sprung.....	Vermont.
Andrew J. Flanagan....	Massachusetts.	Charles H. Stadlinger...	New Jersey.
Annie T. Focht.....	Pennsylvania.	William S. Storer.....	New York.
Frederick M. Fulkerson.	Missouri.	Edward S. Talbot.....	Maine.
Jesse P. Garvin.....	Wisconsin.	Charles B. Tiley.....	Connecticut.
Fred. W. Gibson.....	California.	Fred R. Thompson.....	New York.
John W. Gibson, M.D.	California.	W. Irving Thompson...	Kentucky.
Marinda B. Gifford....	Massachusetts.	Henry R. Thornton....	Canada.
Thomas C. Gledhill.....	England.	William F. Tremain....	New York.
Harry A. Glover.....	Indiana.	Dalton Trumbauer.....	Pennsylvania.
John W. Glover.....	Pennsylvania.	T. T. Tunstall.....	Alabama.
Arthur Y. Greene.....	Massachusetts.	Charles H. Turley.....	Pennsylvania.
A. DeWitt Gritman.....	New York.	Charles M. Vanderslice.	Pennsylvania.
Frederick L. Hamm.....	Ohio.	Charles W. Varcoe.....	New York.
James N. Huris.....	Canada.	David P. Ver Valen.....	Brazil.
Frank A. Hatch.....	Massachusetts.	A. T. Watson.....	Canada.
Charles Q. Hillegas....	Pennsylvania.	David H. Waugh.....	Canada.
William M. Hodsdon....	Massachusetts.	B. Gifford Weber.....	Pennsylvania.
Joseph L. Holberg.....	Mississippi.	Harry W. Wellman.....	Missouri.
W. J. Hunt.....	Massachusetts.	Albert C. White, Jr....	Rhode Island.
Henry A. Ickes.....	Pennsylvania.	James G. Whiting.....	Illinois.
Alice I. Ireland.....	New York.	W. E. Willmott, L.D.S.	Canada.
J. William Jacob.....	Pennsylvania.	J. Alexander Williams.	Canada.
Benn C. Jewett.....	New York.	Dan. M. Wood.....	Indiana.
Albert B. Johnson.....	Connecticut.	Eliza Yerkes.....	Pennsylvania.

## NEW YORK COLLEGE OF DENTISTRY.

THE twenty-third annual commencement of the New York College of Dentistry was held at Chickering Hall, New York City, on Monday evening, March 11, 1889.

The valedictory address was delivered by John Charles Oberle, D.D.S.; the address to the graduates by Rev. Henry Y. Satterlee, D.D.

The number of matriculates for the session was two hundred and forty-five.

The degree of D.D.S. was conferred on the following graduates by William T. LaRoche, D.D.S., vice-president of the board of trustees:

NAME.	STATE OR COUNTRY.	NAME.	STATE OR COUNTRY.
Arthur Beaumont.....	England.	William H. Moon....	Pennsylvania.
Wm. A. Berendsohn.....	New York.	Michael Maskovich...	Russia.
Albert Bandmann.....	Germany.	William S. May.....	Montana.
Walter H. Bedell.....	New York.	Norman S. Morgan....	New Jersey.
Victor C. Bell.....	Russia.	George E. McKugan...	New Jersey.
Henry N. Berthiaume.....	Rhode Island.	Henry F. Maasch.....	Germany.
Frank W. Bridges.....	Brooklyn.	John B. Merritt.....	New York.
William N. Bush, Jr.....	Brooklyn.	Ira L. Nickerson.....	New York.
Edwin Cudlipp.....	New York.	John C. Oberlé.....	New York.
Isaac W. Claypoole....	New Jersey.	Edward Owens.....	Ireland.
Alfred D'Orville Doty...	New York.	Henry P. Osborn.....	New Jersey.
John W. Davy.....	Ohio.	Frank R. Parsons....	Massachusetts.
J. Marion Edmunds....	Pennsylvania.	George E. Pool.....	Brooklyn.
Stacy R. Everett.....	New Jersey.	Edward H. Pease.....	Vermont.
Ralph W. Emerson....	New Jersey.	Alfred W. Repelovski...	New York.
Howard H. Fox.....	New York.	Juan A. Riaño.....	U.S. of Colombia.
Enrique R. Gonzalez...	Porto Rico.	William E. Rice.....	Connecticut.
Rudolph H. E. Gude-		Edwin S. Robinson...	New York.
will .....	Germany.	Alfred D. Seaver.....	New Jersey.
James G. Gallagher....	New York.	Abraham L. Sterne....	Washington, D.C.
Frank G. Gregory.....	Brooklyn.	Max Sterne.....	Germany.
Harry C. Green .....	Brooklyn.	Frederick R. Smith...	New York.
Samuel Hess.....	New York.	Abraham L. Smyth....	New York.
Henry Heath, Jr.....	New York.	Raphael Stork .....	Germany.
Robert G. Hutchinson,		Primus C. Smith.....	Canada.
Jr.....	New York.	Clarence W. Steele ...	Vermont.
Cyrus A. Jordan, Jr....	Long Island.	Edward H. Sears.....	Staten Island.
Wilhelm Kull.....	Switzerland.	Edward H. Werner....	Illinois.
Michael Leo.....	Germany.	Sigmund Wintner.....	Kentucky.
Moritz H. Leukowicz...	Austria.	Robert M. Wollison...	Massachusetts.
Edward F. Lauchantin...	Brooklyn.	Heinrich C. L. Weber...	Finland.
William S. Loomis....	Iowa.	William H. Webber...	Massachusetts.
George MacNally.....	Argentine Repub.	George E. T. Ward....	Connecticut.
Edward I. Mead.....	Connecticut.	Charles S. Willson....	Brooklyn.
Pablo R. Moreno .....	Mexico.	Edward Waugh.....	Canada.
Ludwig M. Meyer.....	New York.	George E. Wilcox.....	Connecticut.

## UNIVERSITY OF TENNESSEE—DENTAL DEPARTMENT.

THE eleventh annual commencement of the Dental Department of the University of Tennessee was held in the Masonic Theater, Nashville, Tenn., on Tuesday, February 26, 1889.

The valedictory was delivered by Robert D. Crutcher, D.D.S., and the charge to the graduates by Professor W. E. McCampbell, A.M., M.D.



The number of matriculates for the session was twenty-two.

The degree of D.D.S. was conferred on the following graduates by Charles W. Dabney, Jr., Ph.D., president of the university :

NAME.	STATE OR COUNTRY.	NAME.	STATE OR COUNTRY.
Charles H. Alexander.....	Tennessee.	Edward E. Slaton.....	Alabama.
Twiggs R. Boger.....	Georgia.	Samuel J. Spargo.....	Tennessee.
Arthur J. Cottrell.....	Tennessee.	J. C. Spivey.....	Mississippi.
Robert D. Crutcher.....	Tennessee.	W. Andrew Towns.....	Tennessee.
Joseph B. Harris.....	Mississippi.	Alvin S. Willis.....	Tennessee.
Eugene L. Holmes.....	Mississippi.	W. M. Harris (Honorary)...	Tennessee.
James H. Moore.....	Alabama.		

### INDIANA DENTAL COLLEGE.

THE tenth annual commencement exercises of the Indiana Dental College were held in the Young Men's Christian Association Hall, Indianapolis, Ind., on Wednesday, March 6, 1889, at 8 P.M.

Addresses were delivered by Dr. John Chambers and Professor Coulter, of Wabash College.

The number of matriculates for the session was fifty-one.

The degree of D.D.S. was conferred on the following graduates by W. L. Heiskell, D.D.S., president of the faculty :

NAME.	STATE OR COUNTRY.	NAME.	STATE OR COUNTRY.
M. F. Ault.....	Indiana.	Charles S. Hardy.....	Canada.
Peter S. Bower.....	Indiana.	Bion Moss.....	Wisconsin.
Ward E. Bullard.....	Indiana.	George B. Martin.....	Michigan.
Robert I. Blakeman.....	Kentucky.	Moses P. Niswonger.....	Ohio.
Harry W. Cole.....	Indiana.	Frederick H. Reiss.....	Illinois.
Waldo E. Caliane.....	Indiana.	Charles K. Raber.....	Wisconsin.
Sidney W. Curtis.....	West Va.	W. Ellis Weissell....	Indiana.
William Finn.....	Wisconsin.	John C. Walker.....	Kansas.
Willard W. Gates.....	Indiana.		

### KANSAS CITY DENTAL COLLEGE.

THE eighth annual commencement of the Kansas City Dental College was held, in connection with that of the Kansas City Medical College, at Music Hall, Kansas City, Mo., on Monday, March 11, 1889, at 8 o'clock P.M.

The annual address was delivered by Rev. J. E. Roberts, and the address on behalf of the faculty by C. B. Hewett, D.D.S.

The number of matriculates for the session was thirty.

The degree of D.D.S. was conferred on the following graduates by E. W. Schauffler, president of the faculty :

NAME.	STATE OR COUNTRY.	NAME.	STATE OR COUNTRY.
Rice R. Buchanan.....	Dakota.	Charles V. Larmer.....	Missouri.
Fritz Baum.....	Prussia.	Arthur E. McKellar.....	Kansas.
Ben. H. Dickson.....	Kansas.	Ross T. Thomas.....	Missouri.
Jefferson D. Hanna.....	Missouri.	Frank L. Warren.....	Kansas.
Horace J. Hughs.....	Kansas.	Samuel C. Wheat.....	Missouri.
Newton W. Hiatt.....	Indiana.		

### VANDERBILT UNIVERSITY—DEPARTMENT OF DENTISTRY.

THE tenth annual commencement of the Department of Dentistry of Vanderbilt University was held in the Masonic Theater, Nashville, Tenn., on Wednesday evening, February 20, 1889.

The faculty address was delivered by Prof. D. R. Stubblefield, and the valedictory by J. McClark, D.D.S.

The number of matriculates for the session was ninety-five.

The degree of D.D.S. was conferred on the following graduates by Landon C. Garland, LL.D., chancellor of the university :

NAME.	STATE.	NAME.	STATE.
J. W. Allen.....	Alabama.	R. P. Henderson.....	Alabama.
T. C. Burgess.....	Tennessee.	S. H. Johnson.....	Mississippi.
C. S. Boyd.....	Alabama.	Robert Kettner .....	Michigan.
G. R. Crain.....	Tennessee.	S. H. McKee.....	Georgia.
J. McClark.....		J. C. McDavitt.....	
W. R. Desobry.....	Louisiana.	A. A. McClannahan..	Indiana.
O. C. Farish.....	Alabama.	O. McNeeley.....	Pennsylvania.
Jos. W. Ford.....	Kentucky.	W. Norconk.....	Michigan.
J. C. Green.....	Alabama.	D. F. Orr.....	Virginia.
J. C. Goodwin.....	North Carolina.	J. L. Tichenor.....	Texas.
W. C. Guess.....	Mississippi.	A. W. Trotter.....	Tennessee.
J. B. Haddan.....	Kentucky.	J. O. Templeton.....	Tennessee.
W. H. Helden.....	Alabama.	J. C. Wasson.....	Kentucky.
O. M. Huestis.....	Dakota.	R. M. Walker.....	Illinois.

### UNIVERSITY OF IOWA—DENTAL DEPARTMENT.

THE seventh annual commencement exercises of the Dental Department of the State University of Iowa were held at the Opera House, Iowa City, Iowa, on Monday, March 4, 1889, at 8 o'clock P.M.

The annual address on behalf of the faculty was delivered by the Hon. Albert W. Swalm.

The number of matriculates for the session was seventy-nine.

The degree of D.D.S. was conferred on the following graduates by Charles A. Schaeffer, Ph.D., president of the university :

NAME.	STATE.	NAME.	STATE.
Emma E. Auger.....	Iowa.	F. C. Noyes.....	Iowa.
George Burt Colt.....	Pennsylvania.	James A. Ogg.....	Minnesota.
E. Cotton.....	Iowa.	Edward Peek.....	Iowa.
Wm. Gilmore Clark.....	Iowa.	Albert D. Reed.....	Iowa.
Emma Eames Chase.....	Missouri.	Mrs. L. L. Richards, M. D.	Iowa.
George E. Diehl.....	Iowa.	Arthur T. Stillman.....	Iowa.
Kern M. Fullerton.....	Iowa.	Frank Slater.....	Iowa.
Arthur B. Glasier.....	Wisconsin.	G. Dayton Webb.....	Iowa.
William Humphrey.....	Iowa.	L. Alvin Young, M. D.	Missouri.
Irving Burton Kenney.....	Iowa.	A. W. Zeigler.....	Wisconsin.
Ralph B. Murray.....	Dakota.		

### UNIVERSITY OF MARYLAND—DENTAL DEPARTMENT.

THE seventh annual commencement of the Department of Dental Surgery of the University of Maryland was held at the Lyceum Theater, Baltimore, Md., on Wednesday, March 13, 1889.

The reading of the mandamus was by the dean, Professor F. J. S. Gorgas; the address to the graduates was delivered by Dr. J. B. Patrick, and the class oration by Hampton K. Smith, D.D.S.

The number of matriculates for the session was one hundred and twenty.

The degree of D.D.S. was conferred on the following graduates by Hon. S. Teackle Wallis, LL.D., provost of the university:

NAME.	STATE OR COUNTRY.	NAME.	STATE OR COUNTRY.
Charles G. Aven.....	Virginia.	Reuben Benjamin Hills.....	Massachusetts.
Augustine P. Badger....	Maryland.	William H. Holland.....	South Carolina.
Eugene James Bailey....	South Carolina.	John W. McKinnon.....	Pennsylvania.
Victor Durand Barbot....	South Carolina.	William Lee Miller.....	W. Virginia.
Joseph Percy Blair.....	Virginia.	J. England Malony.....	South Carolina.
Frank Beck.....	Pennsylvania.	Solomon L. Nigolosian.....	Asia Minor.
Kelly Ragland Bragg....	Missouri.	Frank M. Oldham.....	South Carolina.
H. Wood Campbell.....	Virginia.	Czeslaus Opielinski.....	Germany.
T. S. D. Covington, Jr....	Virginia.	Geo. B. Patterson.....	North Carolina.
August A. T. W. Cuny.....	Germany.	Frank Zea Pirkey.....	California.
E. Douglas Davis.....	W. Virginia.	Benson S. Roberts.....	Bermuda.
Henry Davis, M.D.....	Missouri.	F. F. W. Schloendorn.....	Germany.
Edwin R. Dodson, M.D.....	Maryland.	Joseph B. Sharp.....	New Jersey.
Pearl Louis Ellis.....	Vermont.	Archie C. Shoemaker....	Pennsylvania.
William Lafayette Fish....	New Jersey.	Benjamin Simons.....	South Carolina.
Harry Augustus Free....	Pennsylvania.	Hampton K. Smith.....	South Carolina.
David Goeblicher.....	Maryland.	C. van der Hoeven, M.D....	Holland.
Joseph H. Haas.....	New York.	William J. Warnock....	South Carolina.
E. Patterson Hayes.....	Pennsylvania.	M. V. Wright, M.D.....	New Hampshire.
Joseph G. Heuissler.....	Maryland.		

### HOWARD UNIVERSITY—DENTAL DEPARTMENT.

THE annual commencement exercises of Howard University, including the Dental Department, were held at the Congregational Church, Washington, D. C., on Saturday evening, March 16, 1889.

The address to the graduates was delivered by Robert Rayburn, M.D., and the valedictory in dentistry by Hamilton Smith, D.D.S.

The number of matriculates for the session was eleven.

The degree of D.D.S. was conferred on the following graduates by W. W. Patton, D.D., LL.D., president of the university:

NAME.	STATE.	NAME.	STATE.
Murdoch S. Campbell.....	Massachusetts.	Charles A. Neall.....	Massachusetts.
John J. Cary.....	Michigan.	Aug. C. Schwartz.....	Ohio.
J. Melvin Lamb, M.D.....	Dist. of Columbia.	Hamilton Smith.....	Massachusetts.

### CENTRAL TENNESSEE COLLEGE—SCHOOL OF DENTISTRY.

THE third annual commencement of the School of Dentistry of Meharry Medical Department of Central Tennessee College was held at Masonic Hall, Nashville, Tenn., February 21, 1889.

The valedictory was delivered by James R. Porter, A.B., D.D.S., and the faculty address by R. F. Boya, M.D., D.D.S.



The degree of D.D.S. was conferred on the following graduates by J. Braden, D.D., president of the faculty :

NAME.	STATE.	NAME.	STATE.
Thos. Aulston Curtis.....	Alabama.	Jas. Bullock Maclin, M.D ..	Louisiana.
Daniel Webster Fields.....	Tennessee.	Jas. Reynolds Porter, A.B..	Mississippi.
Stephen M. Hickman.....	Tennessee.	Alonzo Maury White.....	Tennessee.

### SOUTHERN MEDICAL COLLEGE—DENTAL DEPARTMENT.

THE second annual commencement exercises of the Dental Department of the Southern Medical College were held in DeGive's Opera House, Atlanta, Ga., on Saturday, March 2, 1889, at 8 o'clock P.M.

The annual oration was delivered by the Rev. Dr. Walker, and the valedictory by B. R. McBath, D.D.S.

The number of matriculates for the session was thirty-six.

The degree of D.D.S. was conferred on the following graduates by T. S. Powell, M.D., president of the board of trustees :

NAME.	STATE OR COUNTRY.	NAME.	STATE OR COUNTRY.
J. A. Arbeely, M.D.....	Syria.	J. A. Link.....	Georgia.
Aaron Branch.....	Georgia.	S. M. Lide.....	Georgia.
O. H. Cantrell.....	Georgia.	R. L. Lane.....	Alabama.
M. Z. Crist.....	Kentucky.	B. R. McBath.....	Tennessee.
J. W. Daniel.....	Louisiana.	T. B. Pilcher.....	Georgia.
J. W. Duke.....	Georgia.	R. G. Ragan.....	Alabama.
C. W. Forehand.....	Georgia.	W. T. Sinclair.....	No. Carolina.
H. J. Garland.....	Georgia.	H. B. Williamson.....	Alabama.
S. M. Hyman.....	Georgia.		

### ST. LOUIS COLLEGE OF PHYSICIANS AND SURGEONS—DENTAL DEPARTMENT.

THE annual commencement exercises of the Dental Department of the St. Louis College of Physicians and Surgeons were held at Memorial Hall, St. Louis, Mo., on Friday, March 8, 1889.

The number of matriculates for the session was fourteen.

The degree of D.D.S. was conferred on the following graduates by Louis Bauer, M.D., dean of the faculty :

F. B. Chase,	George O. King,
T. F. Harrington,	Thomas M. Perrine,
Morris Israel,	Hanford Thayer.

### COLUMBIAN UNIVERSITY—DENTAL DEPARTMENT.

THE second annual commencement of the Dental Department of the Columbian University was held at Albaugh's Opera House, Washington, D. C., March 21, 1889.

The address to the graduates was delivered by Professor Henry C. Thompson, D.D.S.

The number of matriculates for the session was fourteen.

The degree of D.D.S. was conferred on the following graduates: John K. Halley, of the District of Columbia; Edith Jewell, of Virginia, and Charles B. Munson, of Virginia.

### ROYAL COLLEGE OF DENTAL SURGEONS OF ONTARIO.

The examination at the Royal College of Dental Surgeons of Ontario was held in Toronto, March 5 to 8, inclusive, 1889. Excepting practical work, the examination is wholly written.

The number of students in attendance for the session of 1888-89 was fifty-two.

The following obtained the diploma conferring the title of L.D.S., viz:—

NAME.	STATE OR COUNTRY.	NAME.	STATE OR COUNTRY.
N. W. Cleary.....	Renfrew.	Chas. S. McLean.....	Brockville.
E. Cunningham.....	Collingwood.	G. P. Matthewman.....	Ottawa.
Edward Eidt.....	Berlin.	H. P. Martin.....	Toronto.
Chas. Ferguson.....	London.	J. W. Oakley.....	Toronto.
A. Hugh Hipple.....	St Catharines	Andrew Rose.....	Picton.
J. T. Ireland.....	Seaforth.	C. A. Risk.....	Aberfeldy.
J. J. Kerr.....	Campbellford.	J. H. Swann.....	Toronto.
Geo. McDonald.....	Arnprior.	A. J. Smith.....	Prescott.
R. G. McLaughlin.....	Brampton.	A. F. Webster, D.D.S....	Toronto.

## EDITORIAL.

### CONCERNING THE INTERNATIONAL DENTAL CONGRESS.

WE have received through Dr. E. A. Bogue an earnest letter addressed to Dr. I. B. Davenport, by the late Dr. E. Brasseur, written only two days before his death, in which he expressed a profound interest in the success of the dental congress to be held in Paris during the coming summer. The letter, which was in reply to a kindly criticism by Dr. W. H. H. Thackston of the term "international" as applied to this convocation, is too long for publication in our pages. It alluded to the fear expressed by Dr. Thackston that the title "international congress" would be looked upon by the medical profession as a virtual withdrawal from the International Medical Congress. Dr. Brasseur not only deprecated any such result, but deprecated alike the fear that such an impression might obtain. He represented the French societies as altogether indisposed to any course that would in the slightest degree impair the relations of dentistry as they had been established at the International Medical Congress of London, maintained at Washington, and are looked forward to at Berlin in 1890. The term "international," he argued, was eminently befitting because it was hoped and expected that

dentists representing all nationalities would be present, and that the same prefix had been adopted by more than sixty art, scientific, and other associations announced to meet in Paris during the same period.

Dr. Brasseur, whose demise is so sincerely regretted, because of the recognition of his energetic and persistent efforts to advance the interests of the dental profession, closed his letter with an earnest appeal to his American colleagues to give up all fear that either in name, in object, or in act the coming meeting would interfere in any way with the relations of the profession to the International Medical Congress; urging all who could to come and take part in the meeting.

### THE DENTAL PROTECTIVE ASSOCIATION OF THE UNITED STATES.

In the January issue we called attention to the incorporation at Chicago of an association under the above title. Its object as set forth is, "In a lawful and equitable manner to unite the strength of our profession to contest the patents of the International Tooth Crown Company, the validity of which has not been established."

We are requested by Dr. J. N. Crouse, chairman of the board of directors (2231 Prairie avenue, Chicago), to say that a circular of information, with a copy of the by-laws, has been sent to every dentist in the United States, and that a favorable response from a large number is earnestly desired and hoped for.

At a meeting of the dentists of St. Louis, held on the evening of March 2, at which Dr. Henry Fisher was called to the chair and Dr. A. H. Fuller acted as secretary, the following resolution, offered by Dr. G. A. Bowman, was unanimously adopted:

*Resolved*, That it is the sense of this body that it is the duty of every dentist to join the "Dental Protective Association of the United States," of which Dr. J. N. Crouse, of Chicago, is chairman, for the purposes set forth in a circular issued by this association.

At the regular meeting of the Chicago Dental Society, held Tuesday evening, March 5, the following resolution was adopted:

*Resolved*, That it is the sentiment of this society that it would be of interest to the members of the dental profession to become members of the Dental Protective Association of the United States

### DYNAMIC ELECTRICITY.

A CORRESPONDENT in San Francisco, commenting upon the editorial in our March issue on dynamic electricity, says that dozens of motors are run by the arc-light current in that city, and that thus far no accident has occurred. The inference is that our correspondent



thinks that the article referred to was calculated to needlessly alarm operators employing electric currents. The fact remains that the arc-light current is capable of destroying life, and the incandescent current is powerful enough to produce very unpleasant effects if passed through the human body. Of course if either current is so employed as to perfectly isolate the hand-piece of the engine, the risk to the patient is obviated, but the danger to the operator remains as relates to the adjustment of the current wires to the motor. If the editorial in question and the correspondence which it introduced shall serve as a caution to any who had not fully appreciated the liabilities in the use of dynamic currents, its purpose will have been served.

### THE RECENT GRADUATES.

ACCORDING to custom we devote the necessary space in the April issue to a record of the names of the graduates of the several schools whose commencements occur during March. The aggregate number this year is 571. Among these there are doubtless some who fall far short of the professional status implied by the degree which they have received; but it is to be hoped that the greater number will be found to grade high in the attainments requisite for the honorable and successful pursuit of the increasingly responsible avocation upon which they have entered,—that they will duly appreciate not only their privileges, but their obligations, and be earnest not merely for their own advancement, but in the effort to raise the standard of dentistry to a still higher professional plane.

### CORRECTION.

IN Dr. A. E. Baldwin's paper on "Root-Filling," published in the March number of the DENTAL COSMOS, the word "suppuration," in the second line from foot of page 171, should be "inflammation."

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### BIBLIOGRAPHICAL.

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TRAITÉ DE DENTISTERIE OPÉRATOIRE. Par E. ANDRIEU, Docteur en médecine de la Faculté de Paris; Président de l'Institut odontotechnique de France; Président honoraire de la Société odontologique; Professeur de clinique à l'École dentaire de France; Dentiste des Hôpitaux. Avec 409 figures intercalées dans le texte. 8vo, pp. 655. Paris, 1889.

A work of this importance demands more than casual mention. It is divided into seven parts, preceded by an introductory section

devoted to a consideration of the leading features of dental anatomy and pathology. As but twenty-two pages in all are assigned to these subjects, it is evident that their exhaustive treatment has not been attempted, and an exposition simply of the mechanical principles and manipulative procedures of operative dentistry must be regarded as the chief purpose of the work. It will be reviewed from this stand-point.

Part First relates to the furniture and apparatus requisite for a well-appointed dental operating-room. The most approved forms of operating-chairs, brackets, instrument-cases, wash-stands, saliva-pumps, dental engines, office lathes, and electrical apparatus are described and copiously illustrated. Of electric mouth-reflectors four forms are shown, and of electric cauteries, eight. The latter, especially, are of great delicacy of construction and, apparently, well adapted to the varied requirements of dental practice. All these forms were devised by the recently deceased Dr. Emile J. N. Brasseur, Director of the Dental School of France, editor of the *Revue Odontologique*, and author of the excellent treatise on "The Surgery of the Teeth and their Annexes" in the "International Encyclopædia of Surgery."

Part Second is devoted to a consideration of "Preparatory Operations," such as the methodical examination of the mouth; cleansing the teeth from deposits of all kinds, and their temporary separation preparatory to the filling of approximate cavities. All the appliances necessary to the perfecting of these processes are fully explained and illustrated. Among these are mouth-mirrors, probes, syringes, scalers, chisels, and the most recent appliances used with the dental engine for cleansing and polishing; wedges and wedge-cutters of various forms are shown, and also the separators of Jarvis, Perry, Bogue, Woodward, and Parr.

In Part Third separate consideration is given to "Resection of the Teeth," a term heretofore chiefly used in general surgery to designate the removal of the articular extremity of a bone; but as in its primary meaning the word signifies the act of cutting or paring off, exception cannot be taken to its employment in the sense intended by the author, viz: the cutting off of any portion of a tooth for any purpose whatever, either to secure a wider space between the teeth, to prepare a tooth for an artificial crown, to better shape a carious cavity, or to remove asperities of surface due to fracture, attrition, decay, or erosion. The subject, of course, calls for a description of separating files, chisels, gouges, engine-points and burs, corundum wheels and disks, etc. Under this section of the work the author gives large space to the consideration of "resections" for the removal of superficial caries and to the anticipative

methods of Arthur and Bonwill, both of the latter being fully illustrated by the cuts used in their original publications on the subject. Of the two procedures the author gives the preference to that of Bonwill, and concludes by stating that he has attained "a success truly remarkable" by taking that which is good in each of the modes of treatment and "setting to one side the exaggerations inherent in every absolute system." A statement which, however oracular, is too indefinite to be instructive as to the method really employed in any given case.

The subject of Part Fourth is "Dental Obturation" or stopping up of carious cavities, a convenient and very appropriate synonym for our usual English terms the "filling" or "stopping" of teeth, or for their French equivalents *bouchage* or *remplissage* of cavities. A few of the subdivisions of this section will indicate the thorough and systematic manner in which it has been treated,—*Cavities considered by classes; Access to the cavity, either by temporary separation or by resection; Opening of the cavity; Ablation of the caries; Appeasement of the physiological sensibility of the dentine; Anchorage of the filling; Form of the cavity; Retaining grooves and pits; Anchorage screws; Exclusion of humidity; Application of rubber-dam; Desiccating of cavity; Filling the cavity; The various forms and qualities of gold employed; Methods of introducing, impacting, and finishing the gold; Fillings of tin, platinum, and porcelain.* The section on "Plastic Obturation" is very full and satisfactory, and is decidedly conservative in tone. The author recognizes the value under certain conditions of all the forms of stopping-material usually employed, and explains very clearly the indications for their employment. Part Fourth, like all the others, is profusely illustrated.

In Part Fifth are considered the "Operations Relative to the Treatment of Intradental and Extradental Complications resulting from Caries." This section embraces pathological sensibility of the dentine; denudations and inflammations, acute and chronic, of the dental pulp; devitalization and extirpation of the pulp; preparation and filling of pulp-canals. For the latter purpose, when the canal has been fully opened and cleansed, the author prefers Hill's stopping; but for that large class of cases where the apex of the root cannot be fully reached, he recommends a thread of lead filed into suitable size and shape and thrust as far as possible towards the extremity of the root, the advantage claimed being that if a filament of pulp remains the contact of the lead will not cause inflammation, and that the lead oxide which will speedily form will prevent putrefaction. Such extradental complications as inflammation of the peridental membrane, alveolar abscess, fistula, etc., are but briefly considered. Antiseptic treatment receives but casual mention



anywhere in the volume. Part Fifth concludes with a section on "Bleaching of Discolored Teeth."

Part Sixth is devoted to "Extraction of the Teeth," its indications, contra-indications, technique, difficulties, and accidents. This section is clear, concise, and well illustrated. It concludes with a brief resumé of the subject of anesthesia, local and general; of general anesthetics only nitrous oxide gas being considered.

In Part Seventh a variety of topics are treated of. Among these are "Ablation of epulis," "Gingivotomy," "Surgical treatment of pyorrhea alveolaris," "Auriculo-temporal neurotomy," and "Grafting of teeth," this term embracing transplantation, replantation, and implantation. The subject of Orthodontia is entirely omitted in the present work. The author regards it as a special branch of dentistry, and reserves it for a separate volume now in preparation.

In that most difficult task of classifying in a systematic manner the intricate and involved details of operative dental practice, the author has achieved a success worthy of all praise. Within its limitations the work is a model of system and thoroughness. Prof. Andrieu possesses the teaching faculty in an eminent degree, and his style is always concise, clear, and informing. Previous to the publication of this volume he had already secured for himself a wide reputation as a writer on dental subjects by his excellent translation and annotation of the Austen edition of Harris's "Principles and Practice of Dental Surgery" (1884), and by his treatise on "Buccal Prosthesis and Mechanical Dentistry" (1887). Of the present treatise not only may it be said that it fully sustains the reputation gained by these earlier writings, but that as regards the technique of dentistry it is by far the most important contribution to dental literature ever made by a French author.

**THE PRINCIPLES AND PRACTICE OF DENTISTRY:** Including Anatomy, Physiology, Pathology, Therapeutics, Dental Surgery and Mechanism. By CHAPIN A. HARRIS, M.D., D.D.S., late President of the Baltimore Dental College, author of "Dictionary of Medical Terminology and Dental Surgery." Twelfth Edition, revised and edited by FERDINAND J. S. GORGAS, A.M., M.D., D.D.S., author of "Dental Medicine," etc. With one full-page plate and 1028 illustrations. Octavo, 1212 pp. and index. Philadelphia: P. Blakiston, Son & Co., 1889. Price, cloth, \$7.00; leather, \$8.00.

Twelve editions, running through nearly a half-century of uniform adoption as the principal text-book in all dental educational institutions, indicates the recognized value of this initial work of the father of modern dentistry. The present volume, of twelve hundred and twelve pages and index, and more than one thousand

illustrations, comprises the later phases of dental progress in principles and practice, and is creditable alike to editor and publisher. Neither the student, the practitioner, nor the teacher is fully equipped without the possession of this volume.

**DENTAL SCIENCE:** Questions and Answers on Dental Materia Medica, Dental Physiology, Dental Pathology and Therapeutics. By **LUMAN C. INGERSOLL, A.M., D.D.S.**, Dean of the Dental Department of the State University of Iowa, 1882 to 1888. Second Edition. Octavo, 140 pp. Philadelphia: Wilmington Dental Manufacturing Co., 1889. Price, cloth, \$2 00.

The author has intelligently and tersely presented the principal points of the topics which form the subject-matter of the volume, and the catechetical character of the work is well calculated to fix the substance of the teaching firmly in the mind of the pupil for whom the text-book is primarily designed.

The blank interleaves afford ready means for recording corroborative or opposing facts and opinions by either the student, the teacher, or the practitioner, who each and all will find the volume a very valuable addition to the dental library. To the post-graduate it will prove especially helpful in its condensation of salient facts and suggestions of alternative methods relating to the exigencies of actual practice.

**SEVENTH ANNUAL REPORT OF THE ILLINOIS STATE BOARD OF DENTAL EXAMINERS**, made to the Governor of Illinois in pursuance of law, December 15, 1888.

The members of the board are: Drs. R. N. Lawrence, president, Lincoln; Homer Judd, Upper Alton; C. A. Kitchen, Rockford; C. Stoddard Smith, Chicago; C. R. E. Koch, secretary, Chicago. The report evidences careful, painstaking work, for next to no compensation other than the satisfaction of having intelligently executed the provisions of the law, and having produced a report which is a model of succinct statement and admirably tabulated results. The great value of such reports will be more apparent as the practical operation of dental laws comes to be thoroughly studied in the light of experience. To the courtesy of the competent secretary we are indebted for an advance copy of the report.

**TRANSACTIONS OF NEW YORK ODONTOLOGICAL SOCIETY FOR 1888.** Philadelphia: The S. S. White Dental Manufacturing Co., 1889.

Histology, filling-materials, alveolar abscess, implantation, dental education, filing and extracting, disease of the antrum, etc., were among the leading topics which engaged the attention of this im-

portant society during its meetings of 1888. The transactions, reprinted from the monthly issues of the DENTAL COSMOS, are here presented in neat and attractive form in a bound volume of 176 pages.

#### PAMPHLETS RECEIVED.

Contributions to the History of Development of the Teeth. By Carl Heitzmann, M.D., and C. F. W. Bödecker, D.D.S., M.D.S. Reprinted from the *Independent Practitioner*, volumes viii and ix.

Second Biennial Report of the Vermont Board of Dental Examiners, September 1, 1888. West Randolph: W. S. S. Buck, printer, 1888.

Porcelain Dental Art: The New Process of Restoring Decayed and Defective Teeth to their original appearance in shape, size, and color. By C. H. Land. Detroit, Mich., 1888.

Bureau of Education, Circulars of Information: No. 2, Contributions to American Educational History, edited by Herbert S. Adams. No. 3, The History of Education in North Carolina, by Charles Lee Smith, of Johns Hopkins University. No. 5, Industrial Education in the South, by Rev. A. D. Mayo. Washington: Government Printing Office, 1888.

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### OBITUARY.

#### DR. WILLIAM A. HUBER.

DIED, at Lebanon, Pa., February 25, 1889, WILLIAM A. HUBER, M.D., dentist, in the sixty-seventh year of his age.

Dr. Huber was born at Myerstown, Pa., October 22, 1822. He received his early education in the old-time subscription schools, and afterwards entered the Pennsylvania College at Gettysburg, where he graduated in 1846. He began the study of medicine under Dr. J. W. Gloninger, a practicing physician of Lebanon. He then went to New York, where, in addition to pursuing his medical course, he also studied dentistry under Dr. Blaisdell, of that city. He received his degree from the New York College of Physicians and Surgeons March 22, 1849.

Shortly afterwards Dr. Huber located at Lebanon, Pa., and was one of the pioneers of dentistry in that part of the State, where he practiced with great success for twenty-five years; but for several years past poor health has compelled him to relinquish active work. He leaves one son, Wm. S. Huber, D.D.S., M.D., who is in dental practice at Lebanon.



## HINTS AND QUERIES.

TO THE EDITOR OF THE DENTAL COSMOS :

SIR,—On page 149 of the February number of the DENTAL COSMOS Dr. A. P. Southwick is reported as saying that  $280^{\circ}$  to  $285^{\circ}$  F. is the highest temperature that should be employed in vulcanizing, and the time should be two hours. Assuming the reliability of the report, and that the doctor knew whereof he affirmed, I proceeded to vulcanize a full upper set in this manner, maintaining a temperature of  $282^{\circ}$  for two hours. Upon opening the flask I found the plate as soft as felt, and unfit for use. For thirteen years I have followed the rule given by all authorities,—a temperature of  $320^{\circ}$ , time fifty to sixty minutes, which produces a plate that is elastic and capable of a high polish.

Having first inquired of the editor of the COSMOS as to the correctness of the report of Dr. Southwick's statement, and having been assured that he was correctly reported, I wrote to the doctor and received in reply the following: " $300^{\circ}$  F. is as high a heat as rubber should ever be subjected to, and I think as high as it can be carried without injury. Rubber will vulcanize in two hours at  $300^{\circ}$  F." Between the COSMOS report and the doctor's letter there is the difference of from fifteen to twenty degrees. I am myself ready to go on record with the assertion that a rubber which will vulcanize at  $320^{\circ}$  F. in fifty minutes will also vulcanize at a temperature of  $300^{\circ}$  F. maintained for two hours. I agree with Dr. Southwick that there are advantages in vulcanizing at the lowest degree of heat which will effect the desired result, but if Dr. Southwick can vulcanize successfully at the heat and in the time which he is reported to have claimed he could do, his experience differs from mine. There are others beside myself who would be glad to read what he has to say further on this subject.—C. S. W. SCHOMO, Ashland, Pa.

LOGAN CROWN SETTER.—For setting the Logan or similar crowns with gutta-percha, I have constructed a copper holder and heater as follows:

Taking a piece of half-inch round copper rod, I forge at a red heat a tang to about half the diameter of the socket in a suitable wood handle. I cut off the rod so that it will project about two inches from the handle. The end of the rod is then scarfed on both sides to give it the shape of a tenon a little less than a quarter of an inch thick, three-quarters of an inch long, and the full width of the rod. In this tenon I cut a V-shaped notch, in which a lateral crown will fit and be held. By suitably concaving the notch, a central or cuspid may also be held in it. Into the large socket of the handle I put some stiff-mixed plaster and set the tang of the holder. This I can then heat without making the handle hot, and the copper carries the heat to the crown so that the gutta-percha will be quickly softened and kept soft until the crown is set exactly in place. The jaws of the setter can easily be bent open or closed to fit teeth of different sizes.

For the lower teeth I employ a setter bent at a right angle three-quarters of an inch from its end. Obviously, special setters for bicuspid and molar crowns may in like manner be made.—W. S. PAYSON, D.D.S., Castine, Me.

AN EXPERIMENT IN TOOTH-GRAFTING.—On the 2d day of September, 1888, a man aged about twenty-two years consulted me regarding the loss of both superior lateral incisors. Teeth on a vulcanite plate had been tried without success. I found remaining portions of the roots having frail edges at quite a distance beneath the margins of the gums. I at once bored out the roots to form large and deep cone-shaped cavities, in which were closely fitted the roots of two

natural incisors, that by reason of their very small roots required but little grinding for adaptation. Notches were cut in each of the roots, which were then thinly coated with cement and set tightly in their root-sockets, in the same manner that Logan crowns are set. The grafted teeth had been extracted two or three months previously, and when first set appeared somewhat discolored, but they subsequently assumed the same color as the adjacent teeth, and on yesterday (January 25) they were found to be as firmly attached as on the day of their insertion.—W. O. ALVIS, Waxahachie, Texas.

**WEIGHTED CEMENT TABLET.**—A four-ounce bottle having smooth, flat sides,—preferably of square form without chamfered edges,—and filled with shot, makes a convenient and stable mixing tablet for cement. The weight of the bottle aids in keeping it from sliding under the spatula while a stiff mix is being made, and the four sides admit of repeated use without stopping to perfectly clean them.—J. H. BEEBEE, Rochester, N. Y.

TO THE EDITOR OF THE DENTAL COSMOS:

DEAR SIR,—One of my patients, Dr. A. G. Grinnan, a gentleman advanced in years and highly accomplished, has in his possession a copy of the *Williamsburg (Va.) Gazette* of 1771, in which there is a quaint dental advertisement. The doctor has kindly furnished me with an exact copy, with capitals and punctuation. It is curious and voluminous, almost equal to some we see in the papers of to-day. I think it would interest the profession, therefore send a copy, hoping you may publish it in the DENTAL COSMOS. Very truly yours, F. B. PERRY, Orange, Va, Feb. 29, 1889.

“Mr. Baker, Surgeon Dentist,

Begs leave to inform the Gentry that he is now at Mr Maupins in Williamsburg, and will wait on them on receiving their Commands. He cures the SCURVY in the GUMS be it ever so bad: first cleans and scales the Teeth from that corrosive, tartarous, gritty substance which hinders the Gums from growing—infects the Breath, and is one of the principal causes of the Scurvey, which if not timely prevented eats away the Gums, So that many peoples teeth fall . . . [here two words cannot be deciphered]. He prevents Teeth from growing rotten, keeps such as are decayed from becoming worse, even to old Age, makes Gums grow up firm to the Teeth, and renders them white and beautiful.

“He fills up with Lead or Gold those that are hollow, so as to render them useful: it prevents the Air from getting into them, which aggravates the Pain. He transplants Natural Teeth from one Person to another, which will be as firm in the Jaw as if they originally grew there, without any Ligament. He makes and fixes artificial Teeth with the greatest Exactness and Nicety, without Pain or the least Inconvenience, so that they may eat, drink, or sleep with them in their Mouths as natural Ones, from which they cannot be discovered by the sharpest Eye.

“He displaces Teeth and Stumps after the best and easiest Methods, be they ever so deep set in the socket of the Gums. He has given sufficient Proof of his Abilities in this Art to the principal Nobility, Gentry, and others of Great Brittain, France, Ireland, Holland, and other principal Places in Europe and America: also to upwards of two Thousand Persons in New York and Boston.

“N. B. His DENTRIFICE is quite free from any corrosive Preparation, will restore the Gums to their pristine state, will prevent the Toothache, and render the Breath delicately Sweet, if the tartarous substance is off the Teeth, and will remedy all those Disorders that are the consequence of scorbutick Gums. It may be had, with proper Directions, at his Lodgings: each Pot is sealed with his Coat of Arms, as in the Margin of the Directions, to prevent Fraud.”

# A MONTHLY BIBLIOGRAPHY OF DENTAL LITERATURE.

COMPILED BY J. MELVIN LAMB, M D, WASHINGTON, D. C.

THIS bibliography will be continued monthly in the **DENTAL COSMOS**, and will furnish as complete a record of dental literature as can be gleaned from current periodicals and transactions of societies

The abbreviations of titles used are those common to bibliographical work, and will, it is presumed, be readily comprehended by any one familiar with dental or scientific publications. Any explanation will be gladly furnished by the compiler.

**Abonyi** (Josef.) A fogászat és műteteinek rövid kézikönyve. Kurzes Handbuch der Zahnheilkunde und ihrer Operationen Budapest, 1888.

**Andrieu** (E.) Traité de prothèse buccale et de mécanique dentaire Paris, 1888. 600 p. 8°.

**Black** (G. V.) A study of the histological characters of the periosteum and peridental membrane Chicago, 1889, W. T. Keener. 8°.

**Bramsen** (Alfred.) Les dents de nos enfants, conseils aux mères de famille. Paris, 1889, J. B. Baillière et fils ix, 140 p. 12°.

**Brannt** (William F.) Metallic alloys. A practical guide for the manufacture of all kinds of alloys, amalgams, and solders used by metal workers . . . dentists, etc. Edited chiefly from the German of A. Krupp and Andreas Wildberger. London, 1888, Sampson Low & Co. 8°.

**Brasseur** (M. E.) Chirurgie des dents et de leurs annexes. Paris, 1888. 8°.

**Essig** (Chas. J.) Zahntechnische Metallurgie (und praktische Darstel-

lung der Anfertigung von Metallgebissen.) Authorized translation by August Polseher. Dresden, 1888, Conrad Weiske.

**Fisher** (W. M.) Compulsory attention to the teeth of school children. Dundee, J. P. Matthew & Co.

**Heitzmann** (Carl & C. F. W. Bödecker. Contributions to the history of the development of the teeth. [Reprint from: Independent Practitioner, vols. viii, ix.] 98 p. 8°.

**Monatsschrift** des Vereins Deutscher Zahnkünstler (Vereinsorgan) Herausgegeben vom Verein Deutscher Zahnkünstler. Redakteur, Arthur Stolper. Leipzig ix Jahrgang. No. 1, Januar 1889.

**Stewart** (John.) The mouth; with special reference to the science of dentistry. Glasgow, 1888, J. McGeachy & Co. 100 p. 12°.

**Turevitch** (Eugen.) O vlijanü kokaina na vsasyvanie. [Effect of cocaine by absorption.] St. Petersburg, 1888, Evdokimova, 70 p. 8°.

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# THE DENTAL COSMOS.

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## ORIGINAL COMMUNICATIONS.

### A CASE OF SEPARATION.

BY DR. G. S. DEAN, SAN FRANCISCO, CAL.

IN July, August, and September, 1887, the DENTAL COSMOS laid before the profession a paper presented by Dr. I. B. Davenport to the New York Odontological Society, together with the proceedings of the society in connection with that paper. Dr. Davenport sought to establish certain principles, on the basis given in a portion of the opening sentence of his paper: "Nature has furnished dental arches so formed as to be best;"—his practical conclusion being, of course, that necessarily arrived at by all believers in the perfectness of "Nature's handiwork"—*laissez faire*—in this case, do not separate the teeth—what God hath joined together, let not man put asunder. The society, the greater portion of its members ignoring Dr. Davenport's fundamental proposition (quite correctly, I may say, for, since our every act is due to a deficiency in "Nature's wisdom," the assertion of the excellence of the natural does not demand consideration), proceeded to discuss his practical thesis—that teeth should not be separated. The result could scarcely be called satisfactory. Dr. Davenport proved his thesis, at least as a partial truth; his opponents, with the exception of Drs. Taylor, Clapp, Straw, and Brackett, proved—nothing: they merely advanced, in opposition to his demonstrative models, some opinions. Then the subject was dropped. Thus this leading society discussed without demonstration and dropped unanswered one of the most demonstratively soluble and most practically important questions ever brought before any gathering of dentists. They received Dr. Davenport's paper. They praised it—justly; it merited all the praise they gave. They presented unsupported opinions. They adjourned. And the result of their discussion of the vital subject of Separation *vs.* Contour was—nothing.

The fact that so many members of the society presented for

publication unsupported opinions, could not fail to impress at least, if not to astonish, an external observer. Their statements of belief, unaccompanied by evidence, left me with a feeling that they had practically made opinion the test of truth. Reversely, I proposed that truth should be made the test of opinion. I therefore, as a learner, with a learner's natural interest in the extremely important question at issue, protested against baseless assertion of belief—*vox, et præterea NIHIL*. I insisted that science—that is, *facts*—must be the basis of art—that is, of *practice*. And that I might not appear as a mere critic, finding fault with others and doing nothing myself, I presented, as well as circumstances permitted, the primordial indication and contraindication in the matter to which the society directed special attention,—removal of the sixth-year molar; presenting them in the tangible form of models showing results of the operation in contrasted cases. That is to say, I practiced that for which I contended; I employed the scientific method—the method of demonstration.

Recently, Dr. J. Morgan Howe has revived, before the New York Odontological Society, the subject of separation. He has laid before us a paper on the results of separating operations, which, as a scientific production, will not suffer by comparison with that of Dr. Davenport. It is a presentation of facts, in the unimpeachable form of plaster casts, together with a laudably unbiased consideration of the bearing of these facts on practice. Such a paper cannot fail to benefit the profession. It does not, of course, exhaust the subject; it does not pretend to exhaust it; but it goes further than anyone has yet gone in its consideration; and, as far as it goes, it gives us solid ground on which to base our practice.

On the subject which occupies the bulk of Dr. Howe's paper (the results of separating by extraction), I shall here say nothing. Dr. Brackett had already demonstrated that extraction is not always followed by undesirable rotation. Dr. Howe has completed the demolition of Dr. Davenport's extreme position by showing that there frequently result permanent interdental spaces. It now remains for Dr. Davenport to point out the circumstances under which we may anticipate the sequels which he has presented,—a work which I have already expressed my confidence in Dr. Davenport's superior ability to perform. But Dr. Howe has done more than complete the demolition of Dr. Davenport's position. He has shown us, outside entirely of the questions of rotation and renewed contact, much which is new; and he has placed on a demonstrative basis much which, as matter of mere belief, is old. He has done more even than this; he has, by stating the circumstances under which his results, both favorable and unfavorable, were obtained, given us



a basis for prediction and therefore for rational practice. He has also induced Dr. Bogue to lay before us some forceful cases illustrating the disastrous ignorance of the profession at large on the primitive question of dental surgery—the topical consequences of extraction. Leaving all this, I turn to that which he passes over with a sweeping condemnation. I turn to the subject of separation by cutting.

Here Dr. Howe does not present any models. He merely says that his results have been such as to lead him to condemn the operation—to condemn it, as I understand, *in toto*. From Dr. Howe's statement of consequences, I infer that he operated mainly on young persons, and operated sweepingly (after the Arthur plan). Under these circumstances, I am far from disputing his assertion that the results are evil. But I am also far from acquiescing in his utter condemnation of the operation.

Dr. Howe's objections to separation by cutting are, in appearance, numerous. In reality, however, they resolve themselves, for the most part, into the great objection of Dr. Davenport: "Temporary separations were followed by worse contact." For, if the separations were only temporary, and if the second contact was "worse" (mark the word, for it contains an admission of the evil of contact) than the first, then the other sequels mentioned by the learned essayist are matters of course.

If, therefore, it can be shown that the separations produced by cutting are not always "temporary"—are not always followed by "worse contact"—it will have been shown that cutting is, like extraction, not to be indiscriminately condemned, but to be discriminately employed.

To be discriminately employed on one condition—on condition that it reduces the liability or predisposition to decay. Dr. Bogue tells us that separation fails to accomplish this end. He tells us that separation does not tend, as its advocates assert, to prevent decay; but that, contrariwise, teeth which stand apart are more liable to caries than those which are in contact. I admit the high authority of Dr. Bogue, and therefore dispute his statement with diffidence. Nevertheless, I dispute it. For Dr. Bogue has not demonstrated his proposition; he has given no evidence in its support. Now, every one knows that the buccal and lingual faces of the teeth, exempt from contact, are relatively exempt from caries. And every one has seen hundreds of cases of incipient proximal decay arrested by the extraction of an adjoining tooth. Evidence of the danger of contact, and of the relative safety of isolation, is thus too abundant and too powerful to be swept aside by the *vox et præterea nihil* of any man—even of Dr. Bogue.

Asserting, then (until the contrary shall have been shown), that, so far as predisposition to caries is concerned, all contact is bad and some "worse," it remains to show, by the presentation of an actual case, that cut separations may be maintained for years—that separation by cutting is not *always* followed by "worse contact."

The case which I shall present is one in which the separations were somewhat rudely made,—one in which, therefore, if desirable results have been obtained, these results are due rather to inherent desirability of the operation than to any special method of its performance. The history of the case will be first narrated. The resulting condition of the denture will then be considered.

Somewhere in the neighborhood of fifteen years ago, when I was pursuing my studies preliminary to becoming a "dental student," a lady took counsel of me concerning her teeth. She had some time before found them "breaking down," and had visited a practitioner, who had "filled" them. Now, they were again decaying, and she was contemplating their removal and replacement by an artificial denture. I knew little of dental matters, but it appeared to me that, though some fillings had failed, the teeth were not in a desperate condition, and I urged an effort for their preservation. I noticed that some of them had been cut apart. I also ascertained that the left upper first molar had, some years before, been reduced to three separated root-ends in an effort to remove it.

A year or two later, in the office of my preceptor, I received a call from this lady. I was now more advanced, and consequently better able to appreciate the situation. I found that the patient was of the nervo-sanguine type, robust and in excellent general health, but with a tongue habitually coated and a saliva slightly viscid,—the little digestive difficulty having appeared when the patient was in her "teens," and being therefore probably dependent on a trifling error in the generative system.

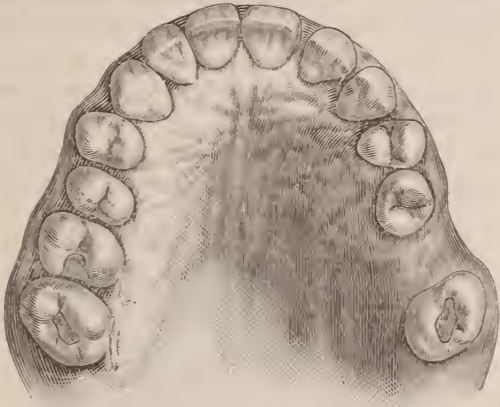
She had acted on my advice,—had visited a dentist, seeking conservation. This gentleman had not restored contour. I followed his example—the more readily as my preceptor was a separationist.

I ascertained that the patient was past twenty years of age when her teeth were separated; that the gums were firm (they were typically "healthy"); and that contact of food did not irritate the interdental gingivæ, but that the patient found the spaces desirable,—they giving no trouble, while they facilitated cleansing.

Now, from the history of the case, and from those matters which the model cannot show, we may turn to the model and note the features which it presents,—the model showing, as has been intimated, the condition of the mouth some fifteen years after the cutting apart of the teeth. (Figs. 1, 2, 3, 4.)

The most apparent peculiarity shown by the model, and therefore the matter which first arrests attention, is the space on both sides of the superior left lateral incisor (Fig. 1). This peculiarity, however, has no direct bearing on our subject, either as cause or as consequence. It is not due to separation by cutting (nor, indeed, to separation by extraction, for the space caused by removal of the first molar re-

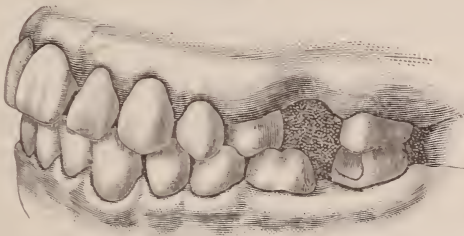
FIG. 1.



mains practically undiminished). Nor, though the space is certainly a symptom of a causal fact, has the space itself any influence on the result.

Leaving this striking but irrelevant feature (and neglecting the anomaly of position of the superior second bicuspid, with which we have evidently here no concern), we pass to the first relevant fact. This fact is the excellence of the articulation (Fig. 2). The cusps of

FIG. 2.



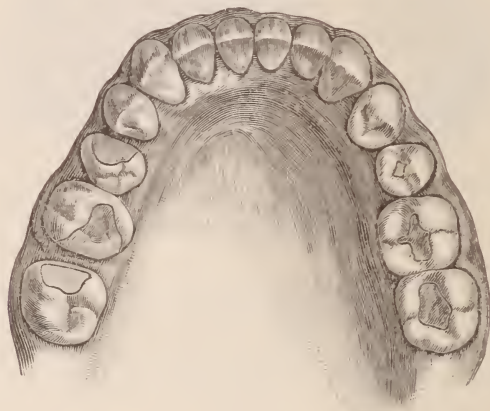
the upper teeth interlock with those of the lower, the tendency of this peculiarity being to prevent approximation of the teeth by lateral movement. It might therefore be supposed that permanence of separation was wholly due to perfection of articulation. But, first, reference to Dr. Howe's case No. 6, as well as to divers other cases which have been reported in the DENTAL COSMOS, will show that a



formed articulation is not a perfect safeguard against either lateral or rotatory movement of the teeth. And, second, removal of the first left superior molar and of a portion of the first left inferior molar has made, in this case, a free space for the forward translation of the second molars,—which translation, however, has not taken place (Fig. 3). This latter fact, in connection with the space between the front teeth (and perhaps the slight but evident diastema between the cuspids and bicuspid on both sides of the lower jaw) points to a separative tendency replacing the usual tendency to approximation.

Further reference to the illustrations will show something more, which will (apart from idiosyncrasy) explain the tendency to separation. The jaws are large; the space is ample for all the teeth which remain (the wisdom-teeth have been removed). It results that the

FIG. 3.



tendency to approximation is neutralized and overpowered; the case being in this respect comparable with Dr. Howe's case No. 3.

In a word, I have chosen for presentation a typical (or "extreme") case,—an example wherein all the indications are for separation. These indications will be briefly stated or summarized when a little further study of the model shall have completed our preparation for their statement;—which further study will relate, not, like our past study, to general features, but to special facts.

First we will contrast the conditions presented by the two sides of the mouth. On the left side, the teeth of both jaws are separated; on the right, the lower teeth are in contact, while the upper teeth have been cut apart. On the left side, the separation is maintained only by general tendency and interlocking articulation (Fig. 3); on the right, there is another factor,—articulation with teeth which are in contact (Fig. 4).

Finally, as to the amount, in the presence of systemic predisposition to caries, of proximal decay. While caries exists, in this mouth, on a majority of those proximal surfaces which were in contact at the time when the systemic predisposition arose, it has not attacked all these surfaces; there are, among those teeth which are in contact (apart from the lower front teeth, which are usually sound), a number of unaffected proximal faces. There is, of course, a reason why these surfaces should be carious, and why those should be sound; but this reason, however important it be that we should know it, lies beyond the scope of the present paper. All which here concerns us is the general fact that not all, but only a portion, of the contact-surfaces are carious. This fact has a manifest bearing on

FIG. 4.



the question whether we are to anticipate caries (especially early caries) on all surfaces which are in contact, and to conduct our practice on the basis of this anticipation.\*

Such are the facts of a typical case. The indications for separation to which these facts lead us, are :

1. A permanent systemic predisposition to dental caries ; that is, an uncorrectable fault of the saliva.

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\* There were originally, in this case, apart from the teeth which have been removed and the six lower front teeth, five natural interdental spaces and fourteen contacts. The faces fronting on the natural separations are all sound ; of the fourteen contacts, five are sound, nine are carious (fifteen proximal cavities). I owe an apology for the non-appearance of these things in the cuts. Not anticipating such generous illustration as the editor has furnished, I neglected to mark positions of fillings on the model. The engraver has therefore represented only those proximal cavities which, on account of frailty of the tooth, were filled "flat,"—he being, of course, unable to detect outline fillings.

While criticising myself, I may notice another oversight,—the omission, through inadvertence, of reference to "disfigurement." Interdental spaces, unless very wide, are not visible from without ; nor, even when perceptible, do they greatly displease in any location except between the central incisors. In the present case, for instance, only one of the spaces is visible externally, and this only because of its extraordinary width. And this visible space is so little displeasing that the lady's friends comment on her "false teeth,"—instinctively judging, through their familiarity with the wretchedness of the natural, that her denture "must be artificial, because it is so handsome."

2. Mature age.
3. Perfect articulation.
4. A jaw of ample size.
5. Healthy gingival tissue.
6. Absence of the third molars.
7. Contact between the teeth with which those to be separated articulate.

8. Actual caries, or at least a definite reason for anticipating the immediate commencement of caries, on the proximal faces of the teeth to be separated (as distinguished from a mere vague expectation based only on the glittering generality, "contact is dangerous").

I may add that there are three further indications which the description of the case has not presented, and which a model cannot show,—these indications being quite as important as those which have been already mentioned.

Of these, the first is an unfavorable general condition of the patient. I separate, even though local conditions seem to call for restoration of contour, when the state of the patient's general health demands brief and painless operations. So, for persons who are timid, I separate for the purpose of reducing an operation to the smallest possible dimensions,—intending to do otherwise when the patient shall have lost his dread of the dental chair. In these cases, it seems to me undeniable that to render less service to the *denture* is to render greater service to the *patient*.

The second indication is frailty of tooth-structure, accompanied by extensive loss of tissue. We all have cases in which the foundation obtainable without devitalization is evidently incapable of supporting an extensive restoration. Here the question is between simple conservative filling and devitalization. And, in the absence of marked indications to the contrary, in the present state of our knowledge of sequels and probabilities, most of us would choose the former alternative.

The third indication is the limit of dollars which the patient can or ought to expend for dentistry. Contour fillings are comparatively expensive. Some of them, to be sure, are no more costly than operations attended by separation. But, on the average, restorations are relatively expensive,—that is, they consume time. And, as there is a necessary limit to the charity of all men, even of the dentist, it is idle to say that we should always perform the operation which best suits the physical conditions, without regard to the financial condition. In a word, our patients are not all rich. They cannot all afford extensive operations. And our duty, as professional men, is certainly to consider *all* the circumstances of the cases which come under our care—among which circumstances is the *res angusta domi*.



In conclusion, I may express the belief that separationists, as a rule, appreciate the fact that, in the absence of caries-producing conditions (that is, in the absence of systemic conditions which predispose to caries by reducing the protective efficacy of the saliva), the solid would be preferable to the spaced denture. They know that, during the first few months of separation—until “function” has indurated the interdental gingivæ—until the mesial gingival margins have been brought to the level of the buccal and palatine margins as regards sensitiveness,—pressure of food between the teeth is unpleasant.

They see too that, for effectiveness in cutting and grinding, the spaceless denture is superior. Glancing over the animal world, they see, amid extreme diversity of dental structure, certain normal facts. They see that animals have, not merely “teeth,” but dentures—dental armatures. They find that certain animals have simple dentures—rows of separate teeth; but they find that these creatures neither cut nor masticate, their dentures being mere prehensile instruments—claws. They find, commonly, among higher animals, two sets of dentures,—an anterior and a posterior, having different functions; and, within the limits of these dentures, they find that contact is the rule. They see that, normally, cutting animals have not merely front teeth, but spaceless anterior dentures—shears. And, with regard to the posterior denture, they see that, though animals which bolt their food have mere points of lateral contact, those which triturate have, usually, solid posterior dentures—mills. In a word, they see that, ordinarily, where, as in man the functions of the anterior and posterior dentures are cutting and grinding, these dentures are spaceless. This fact certainly does no more than establish a probability when taken in connection with the truth of natural selection; it proves nothing; for, as has been already said, the natural is imperfect; consciousness itself is Nature’s confession of her own failure—her call for aid. But the probability which they suggest is confirmed by reason; for we can see, as a matter of cause and effect, that the spaceless mill and the solid blade are superior instruments, for grinding and for cutting respectively, to rows of separate teeth.

The separationists, therefore, separate with regret. They admit that separation is an evil, and they only adopt it as a less evil than that which it aims to prevent. But, in cases where they do not fear closure of the teeth into “worse contact,” their regret is not great. For they find that, generally, in a few months, the tenderness of the interdental gingivæ disappears. And they know that the human denture, like the human lung, has a greater capacity than the needs of the system require—that the separated denture

is efficient enough for all practical purposes. Therefore, as Nature has *not* furnished civilized man either with teeth or with dental arches "so formed as to be best" for preventing caries, and as Nature has conferred on civilized man a special predisponent to caries in the shape of an inefficient and ropy saliva, they make two much-needed improvements on the poor result of "Nature's wisdom": they close the crown fissure in all cases, and they separate the teeth in those cases which present indications for separation.

### NON-COHESIVE HALF-CYLINDER AND LOOP FILLING.

BY ISAAC B. DAVENPORT, M.D., M.D.S., PARIS, FRANCE.

(Read before the New York Odontological Society, February 19, 1889.)

GENTLEMEN: I am impressed with the importance of non-cohesive foil as a filling-material, but I feel I ought to apologize for bringing this matter before men whose long experience with the material has so much better fitted them to speak.

I have been permitted, through the kindness of Dr. Lord, to examine many such fillings made by him, which are perfect to-day after thirty-five years' service.

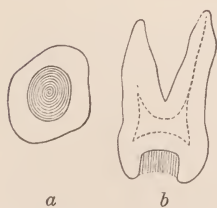
Non-cohesive foil may be used in such masses that the walls of a cavity are spared the danger of direct disintegration by the plugging instrument, while the slipping of the layers of gold upon one another permits their approximation to the wall of the cavity with the least expenditure of force.

In physics, absolute contact between two bodies, or even between atoms composing them, is denied, but experience teaches—and there is no absolute proof to the contrary—that fillings arrest decay in proportion as they approach perfect contact with the wall of the cavity in the first place, and prevent decay in the same cavity in the proportion that the cavity wall continues to be approximated.

Materials which increase in bulk after being inserted in a tooth may somewhat compensate for lack of skill, but such a result is too uncertain to be depended upon.

A round hole with sound and parallel walls would be perfectly filled if it contained a cylinder of gold, the outer layer of which was in contact with the wall of the cavity all around, and if each layer of gold was in contact with its neighbor to the center of the cylinder. This is an impossible result. But imagine such a filling to have been made (Fig. 1, *a*) and a vertical section made through the cavity and filling, there would be formed two perfect compound fillings (Fig. 1, *b*),

FIG. 1.



with each layer of gold placed vertically to the exposed surface of the filling, and each layer of gold would be parallel with the walls of the cavity. It is as if the covers of a book represented the walls of a compound cavity, and the leaves the layers of gold composing the filling; you may trim the corners as you like, and there will be no peeling off of the gold, for each layer is vertical to the surface of the filling. This last condition may be practically realized; but before detailing the method it may be well to examine old methods, and by their defects illustrate in advance some of the advantages of half-cylinder and loop filling.

Wedging is the essential principle of non-cohesive foil work, whether tin or gold be used. In non-cohesive work the foil is usually employed in one or more of the three following forms: 1st, cylinders; 2d, ropes; 3d, folds. Pellets are only short pieces of ropes or folds.

I will speak of these in the order of convenience of explanation. Ropes are essentially cylinders, loosely rolled and bulky, the foil being very much wrinkled in preparation.

One or more of these irregular masses are engaged at a portion of the wall, and others are wedged between or against those in place and folded in and out of the cavity until it is full, then the bulging portion is condensed toward the cavity. Now the whole surface is made up of crimps and folds; sometimes the layers in the folds run parallel and sometimes vertical to the surface, and wherever parallel, flake or scale off by wear, leaving a rough surface, and often exposing a portion of the cavity wall. Because of the flexibility of non-cohesive foil the cavity walls may be tolerably well approximated by it, if considerable force be used, even if the foil be corrugated and uneven, and not in layers parallel with the wall. But success would be more certain if the layers were smooth and parallel with the walls and with one another, thus insuring greater density of the filling by the lateral wedging. If completed in this manner and simply trimmed to the edges of the cavity, a frosted surface would be exhibited, consisting only of the ends of layers of gold, with no folds to peel off and render the work unsightly.

When folds are used and doubled in and out of the cavity, perfect lateral condensation is rendered difficult by the fold, which prevents the free sliding of one layer upon the other, making it work stiffly and producing a filling of very unequal density. The surface of such a filling would be much like one in which ropes had been used.

Cylinders are mostly made by rolling folds of foil, and their condensation and adaptation is more difficult and imperfect than when simple folds are used. A cylinder filling of regular density is almost an impossibility. The later manufactured cylinders are made of



single layers, not folded, and so are capable of better adaptation of the layers upon one another and against the cavity walls. This is true if the cylinder is made of smooth, non-cohesive foil, and if the outside layer is not tampered with by heating and thus made cohesive to prevent its unrolling during transportation; but the fact is that most cylinders, supplied ready-made, are of crimped or corrugated foils, loosely rolled, and really nothing but rolled pellets and not adapted to cylinder work.

The wedging principle made use of in all non-cohesive work, and especially the use of foil cylinders, is well illustrated by the familiar example of cigars in a tumbler, with the row outside and the others wedged into the center. But the example also well illustrates the defects of cylinder work, for the wall is well touched only by the thickest portion of each cigar, and between each is a somewhat triangular space.

In cylinder work the density is much less at some points than at others, and often certain portions of the wall are so imperfectly approached as to constitute a defect, and assure a recurrence of decay. These defects were long ago occasionally noticed even where

FIG. 2.



the usual care had been exercised, and it was with the hope of securing greater scientific accuracy that, seven years ago, I conceived and utilized the present plan.

Dense cylinders of smooth, non-cohesive foil are cut longitudinally, and the half-cylinders thus formed are flattened against the cavity wall (Fig. 2, *a* and *b*).

A condensed *whole cylinder* would give an ovoid mass (Fig. 2, *a'*), which would clearly not be adapted to fill a concavity. Such masses would have cracks and fissures between one another, or at the walls, and a perfect stopping would be an accident rather than a certainty. But a half-cylinder, when condensed, would form a crescent (Fig. 2, *b'*) adapted to the wall, and leaving the general form of the cavity as before its introduction. The inline of the cavity being unchanged by the introduction of the first half-cylinder, each end of which consists of but a single layer of foil, no interstices are left by the addition of other half-cylinders, for each one shingles over the free edges of the previous layer. In this manner perfect approximation to the wall is secured, leaving no corners or fissures.

The half-cylinder does not possess the tendency, always exhibited

by the whole cylinder, of curling up and drawing away from the wall at one point when pressure is applied at another. The shingling of layers one against another should be continued around the cavity until it is full, care being taken that a concave surface is always left for the succeeding layer of gold, and that each layer be smooth and free from folds, so as not to curl up. This disposition of the gold layers is most favorable to thorough lateral condensation against the cavity walls, and the production of a filling of regular and sufficient density to resist wear without flaking.

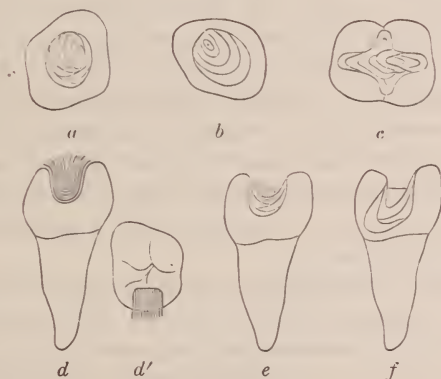
FIG. 3.



For rapidity and accuracy I have found this method of filling simple cavities to excel all others I have tried.

Instead of half-cylinders, what is perhaps still more applicable in many cases is one-half of an ovoid mass, so rolled as to be thinner in one diameter (Fig. 3, *a* and *b*), thus furnishing a loop of gold. These loops are of especial service in oval cavities. I can show contour

FIG. 4.



fillings made in the proximate surfaces of the bicuspid, and extending into the crowns, that were made three and a half years ago, entirely of non-cohesive gold in the form of loops; perfect to-day, although subject to the constant strain of mastication.

I do not consider this method the best for contour work, but the fillings alluded to and made for experimental tests are instructive.

I consider, however, that for filling the first half or two-thirds of compound cavities beginning on the proximate surfaces, this method possesses great advantages: accurate adaptation to the cervical

wall and to the borders of the cavity is assured, with the least danger of subsequent failure at those points. The remaining one-third or one-half of the cavity, including the point of contact and the grinding-surface, had better be of cohesive gold, anchored independently of the non-cohesive layer (Fig. 4, *e* and *f*).

I wish it to be distinctly understood that I consider this only a method, and not *the* method for filling teeth; yet it seems to be the most scientific method of using non-cohesive foils.

A certain depth of cavity is essential for non-cohesive work, and where disease has not already furnished the necessary depth we shall usually do better to respect tooth-substance and use cohesive gold, if gold is indicated.

During the filling of a cavity with soft, non-cohesive gold, portions are sometimes annealed, thus rendering them more or less cohesive, and these are so entangled and wedged between the masses of soft foil as to be retained where no great strength is required. A surface entirely of cohesive gold may thus be secured. I sometimes finish soft gold fillings in the grinding-surfaces with cohesive foil. In very frail teeth a cohesive surface may be employed with advantage by letting it extend over certain edges, while at the same time it prevents the force of articulating teeth from so spreading the plug as to endanger frail walls. However, in a general way, I am coming more and more to think that fillings exposed to the friction of mastication—*i.e.*, those occupying the grinding-surfaces—are more in harmony with the functional requirements of the teeth when made entirely of non-cohesive gold foil. Such fillings do not produce the uncomfortable sensation of hardness and rigidity so commonly experienced with cohesive work, and more marked still with amalgam. They also lack the stony hardness and gritty brittleness of cements; neither do they produce the dragging leaden sensation of tin, or the leathery feel of gutta-percha.

In making the half-cylinders, I always employ Williams's cylinders, rolled, first suggested by Dr. Bogue. These are the only cylinders of which I have knowledge that are fit to use by this method. These, as now made, are tightly rolled No. 4 smooth, non-cohesive gold into sizes 5, 10, 15, 20, and 25, and of lengths 1 minim,  $1\frac{1}{2}$  minims,  $\frac{5}{8}$  in.,  $\frac{3}{8}$  in.,  $\frac{1}{8}$  in., and  $\frac{1}{16}$  inches. These cylinders are designated Style B.

Nos. 5 and 10, length  $\frac{3}{8}$  in. and  $\frac{1}{2}$  in., are the most useful sizes for small cavities. For regular cylinder filling I believe these cylinders are too hard, but their density is exactly what is wanted when cut in two and used as half-cylinders or as loops.

I have failed to induce manufacturers to furnish the half-cylinders, because the layers of gold fall apart when cut open, and if sufficient heat is employed to prevent this the gold is rendered so cohesive as



to be unfit for use. I have been compelled to cut each cylinder as I use it. Machine-cut cylinders would be much better.

One form of loop I more often use than the half-cylinder. Instead of cutting entirely through the cylinder, a cut is made with a sharp lancet from the circumference to the center as it is held between the thumb and finger, and the cylinder is one-half cut through, thus permitting every layer of gold to be opened and flattened against the cavity wall.

Fig. 2, *c*, is a cylinder, and Fig. 3, *c*, an ovoid, cut in this manner.

Figs. 2, *d*, and 3, *d*, show the free ends of the layers as they should be opened out after the cutting, by a dextrous use of the lancet blade.

Fig. 4 represents various plans of disposing the loops in filling cavities; *a*, *b*, and *c* in simple cavities in crowns, and *d* and *d'* an entire compound filling, side and end view; *e* and *f* the lower one-half and entire lining of a compound cavity, the remainder to be filled with cohesive gold. The necessary density should be secured by lateral condensation, and the projecting gold should be cut off.

At the bottom of a cavity I prefer the end of the half-cylinder to rest against a thin layer of gold.

If I may be permitted to announce a suspicion, absolute proof of which I have not, I would suggest the possibility that capillarity is the force which has largely to do with the success or failure of dental operations. I can conceive that capillary creeping of fluids between layers of gold arranged concentrically, as described above, would tend to constantly approximate the gold to the walls of the cavity; and as dentine is an absorbent, the moisture in any possible space between the filling and the tooth would be thereby diminished, thus permitting the pressure of the inner layers of gold to force the outer layer against the cavity wall.

This view may not only be a partial explanation of how porous fillings preserve teeth, but it may explain the rapid decay under a leaky cohesive gold filling, for capillarity in such cases only acts to the detriment of the tooth,—i.e., not tending to tighten the stopping, which has a rigid, unchangeable form.

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## TIN AND GOLD AS A FILLING-MATERIAL.

UEBER DIE COMBINATION VON ZINN UND GOLD ALS FÜLLUNGSMATERIAL FÜR ZÄHNE. Von Dr. W. D. MILLER, Professor am Zahnärztlichen Institut der Universität Berlin. 56 pages, with 51 illustrations.

ABSTRACTS AND TRANSLATIONS BY JAMES TRUMAN, D.D.S.

THIS work on the combination of tin and gold as a filling-material, by Prof. Miller, is not a recent work, as it was issued in 1887; but

while English readers have had the privilege of reading it in translation in the *Dental Record*, I am not aware that it has received any attention at the hands of American journals. This is all the more remarkable when we consider the practical importance of the subject. It can only be explained by the general aversion felt in this country to mixing metals in one cavity, and that natural inertia that keeps the mass of men in the road they began to walk. The dental mind of this country is perfectly familiar with Prof. Miller's work on caries and cognate subjects, and it is with the view of opening up the quality of his labor in other directions, as well as to show the importance of this practice, that I am induced to call attention to it at this time.

This brochure was published, as one of a series, by Dr. Adolph Witzel.

In his introduction Prof. Miller says of tin and gold, "The material to which I desire to turn your attention, a combination of tin and gold, appears to me to greatly lessen the work to both patient and operator in difficult cases, and to increase the permanency of the filling in a way not possible at times to reach with any other material." It is probable that this somewhat strong assertion will not be accepted generally, and yet there can be no doubt of its general correctness. That other materials may and will preserve tooth-structure as well, under favorable circumstances, cannot be denied; but my own observations of tin and gold accord with the conclusions arrived at, that there is nothing better for the preservation of tooth-structure, not even the much-lauded and in many respects very objectionable copper amalgam.

"It is now some twenty-five years since the late Dr. Abbot (Berlin) adopted the combination of tin and gold for the filling of teeth." Those who were familiar, personally, with Dr. Abbot will recall his enthusiastic admiration for this combination, and certainly no one was better qualified to judge of its merits as a filling-material. He was, I think, antagonistic to the use of amalgam to the day of his death, regarding tin and gold as in every way its superior as a filling-material, and with none of its objectionable features. That Prof. Miller should be a consistent advocate, after this experience of his father-in-law, would be a natural result; his adherence, however, is not based on this, influential as it may have been, but on observation and personal experience.

He devotes several pages to the consideration of the electrical action of metals, quoting from various writers, and sums up as follows:

"These assertions are not based upon facts proved by experimentation, and so little has this been done that the advocates have repeatedly acknowledged that no one has as yet been able to discover

this galvanic activity, much less to measure it. Nevertheless, I affirm that electrical currents are certainly to be assumed as present in the mouth as soon as metal fillings are placed there. These currents do not, however, subsist between the filling and the dentine in such manner that the latter could be compared with one of the two electrodes of a galvanic chain; but the electrical processes actually present in the mouth owe their existence entirely to the heterogeneous character of the metal fillings."

Again, he says, "I have repeated the investigations of Chase, in which I filled pieces of ivory and dentine from human and fish teeth with different filling-materials and kept them in acid solutions for a certain time. I convinced myself through a series of experiments (DENTAL COSMOS, 1881, p. 91) that it made absolutely no difference as far as rapidity of loss in weight was concerned whether the piece was filled or not, or what it was filled with. It is quite impossible to explain how Chase came to the result that a piece of dentine filled with oxychloride of zinc is electro-negative and therefore secure against the working of the acid,—in other words, that it is not acted upon by the acid. Dry dentine is a non-conductor, as are all dry organic substances, and as such possesses an infinite power of resistance to all electrical currents. Living dentine is certainly a conductor; but only so far as the dentine is saturated with salt solution. The dentine can no more be made use of as an electrode in a galvanic current than a piece of clay. There can, therefore, no current exist between dentine and a filling, nor can the affinity of the tooth-body for acids be increased or diminished by filling."

*The Preparation of the Materials and Cavities.*—"When I wish to make a tin-gold filling, I lay a sheet of No. 4 non-cohesive gold upon a sheet of No. 4 'extra tough' tin foil. I make use of Abbey's gold foil. These doubled sheets are then cut in two or four strips, as I may want to fill a small or a large cavity. In large cavities I make use of the entire leaf. The strips are taken between the fingers and crumpled into rolls, which I at times employ whole; usually, however, I cut them into pieces from four to twelve millimeters in length, according to the depth of the cavity which I propose to fill. It is immaterial whether the tin or the gold is rolled outside. It is, however, not the same whether the tin or gold be rolled into a soft or a hard rope. The more dense the tin-gold is rolled, the denser will be the cut pellets and the more difficult will be the working of each piece. The tin-gold is, therefore, rolled at first in a circle to the right to a moderately dense rope, then this is repeated to the left to unroll until it is changed into a soft, crumpled rope. Personally I prefer to have the tin on the outside, because it is not as easily torn as the gold. Jenkins (Dresden), who has



used this material for twenty years, prefers the gold outside the tin, because, in his opinion, the color of the finished filling is retained better, and, further, the cavity is better illuminated through a gold than through a tin surface; and, further, the gold is less cohesive than tin. The preparation of the cavity proceeds in the same manner as though for non-cohesive gold."

*The Filling of Teeth with Tin-Gold.*—"The fundamental principle of filling with this material is the same as with non-cohesive gold. It will generally be pressed to the walls of the cavity by the side of the instrument, and with tolerably strong force. The material is allowed to extend above the opening of the cavity, care being taken that the filling proceeds from the sides and not from the bottom of the cavity, and that the edge be covered with an excess."

The illustrations explanatory of this process represent very clearly the insertion of each fold or rope of tin-gold and the instruments with which it is performed. The different cavities are then taken up in order.

*The Filling with Hand and by Rotation,*—from Witzel.—This chapter is devoted to Witzel's methods, which are not in accord with Dr. Miller's views, particularly the mode of using tin-gold. He advocates the Herbst method, or rotation. Dr. Miller does not regard this as applicable to the use of this combination of foils.

*The Properties of the Material.*—"The generally desirable qualities of a filling-material are: 1st, density; 2d, indestructibility; 3d, adaptability; 4th, satisfactory color; 5th, it should be a poor conductor of heat; 6th, it should have no injurious effect on health; 7th, it should be capable of being quickly and easily inserted; 8th, it should receive but little injury from possible inroads of moisture or fluids during the filling. Of these requirements no material possesses so many or in so high a degree as tin-gold."

The density (1) of such a filling, at the beginning, is not much greater than that of a tin filling; but in the course of some weeks a wonderful change takes place, the result of chemico-physical influence, in which the material becomes so hard that it will resist mastication for years without showing any abrasion. The material is not destroyed through the fluids of the mouth, and after the above-mentioned change has taken place the filling remains for the future unaltered.

As to permanent adaptability (3), there are no filling-materials, except the various cements and gutta-percha preparations, that are equal to the tin-gold combination. The material is remarkably soft and adheres with great ease to the walls of the tooth; and further, a change in the filling then takes place,—a slight expansion of the material, which closes hermetically, where perhaps the filling had

before been somewhat defective. Such a result is, however, only to be expected when the carious cavity is perfectly filled with tin-gold. It would be a fatal mistake to assume that such a material, simply condensed upon the surface and insufficiently compressed at the foundation, would swell up by means of this process, and the tooth become in this way thoroughly filled. It can be said that a regularly laid and dense tin-gold filling, through the moderate expansion, will adapt itself closely to the walls of the cavity and continue this contact, in a manner not always reached by gold.

The color (4) is with tin-gold unsatisfactory. The filling is at the beginning gray, and remains in many mouths of that color; in others the color is intensified, and this material is, therefore, not adapted to exposed fillings in anterior teeth. Unlike amalgam, this material never colors the dentine. For all cavities on the distal surfaces of the cuspidati and posterior teeth, as also for the lingual surfaces of the incisors, the color is not objectionable.

This material is (5) a poor conductor, and can therefore be brought nearer the pulp than gold, and has throughout (6) no bad effect upon the general health, the mucous membrane, or the tooth-pulp.

In regard to the rapidity and readiness of insertion (7), the tin-gold combination has but little more to be desired. A large filling upon the masticating surface, which may be filled in fifteen minutes with gold, may be comfortably inserted with tin-gold in from five to six minutes. With complicated approximal fillings the lessening of time will be increased. In central cavities upon the masticating surfaces of molars, the operation can be performed in a shorter time than is usually given to the mixing of amalgam and cement.

The material is (8) not injured by moisture. Fillings may be made completely under saliva, providing the cavity has been previously saturated with an antiseptic solution. The union of the two metals seems indeed to take place more rapidly when the filling has been made under moisture, provided of course the material is thoroughly condensed. I do not mean by this that the filling *should* be laid wet, only that it *may* be. It is somewhat easier to insert and properly condense the material when it is kept dry.

*The Character of Cases in which this Material is Used.*—Miller uses in his practice tin-gold most satisfactorily in cases of "teeth with little resisting power, with enamel soft and chalky, where it is desired to have a water-tight filling" It is often impossible to obtain this result with gold; with amalgam more rarely; the result being that often in a short time the edges are affected with secondary caries. From long years of observation, he is convinced that this evil is prevented by the tin-gold filling.

"I use this material also in such cases where it is not possible to

secure satisfactory dryness, as in caries on the approximal and buccal surfaces extending under the gums, and in teeth that have not been fully erupted, and where the application of the rubber-dam is both difficult and painful. In brief, where it is difficult to keep the fluids of the mouth from interfering."

He finds this treatment especially valuable for the first permanent molars in the earlier years, and later the filling can be capped with gold.

"This material is especially to be recommended for teeth with very sensitive dentine. With this filling no special retaining points or deep undercuts are necessary. It is valuable for teeth sensitive to changes of temperature, the tin-gold being a poorer conductor than gold. Where gold is contra-indicated, this material may be used to overcome thermal action.

"The tin-gold is especially valuable where caries has gradually destroyed the tissue near the pulp, and where it is not advisable to remove the small portion of softened dentine covering it from the bottom of the cavity. For the satisfactory sterilization of such cavities, where it is desirable to protect the pulp by soft carious dentine, the first pellets may be saturated with carbolic acid or other antiseptic. One may then proceed directly with the filling without removing the antiseptic, as the material will not be injured by moisture. I have repeatedly observed that the softened dentine under such fillings has become denser. A tooth showing this hardening of softened dentine under a tin-gold filling was shown by Rob. Richter (Berlin) at the fifteenth yearly assembling of the German physicists and physicians.

"In children's teeth in which the pulp is not inflamed, the tin-gold filling is of peculiar value. With young and anxious patients I only free the cavity from particles of food and the external layer of carious dentine, saturate the parts with carbolic acid, and immediately insert the tin-gold and condense. The whole operation, in central cavities of molars, may be completed in from one to two minutes. I have found such fillings last for years in good condition." It is understood that with older children of six years, more time should be given. Approximal cavities of children should, however, be filled with cement or amalgam.

"According to the observations of Witzel, there exists an electrical current between gold clasps and amalgam fillings which, on the one hand, results in electrical decomposition of the amalgam, and on the other sets free the mercury, and this destroys the gold clasp. It is necessary, therefore, when a gold clasp is to be used and where the gold comes in contact with a filling, to always, where possible, make use of tin and gold."



*The Combination of Tin-Gold with Pure Gold.*—"A very satisfactory and increasing application of tin-gold is in bringing it in combination with pure gold. I must correct a very general fear expressed, that the covering of the tin-gold with pure gold is necessary upon the masticating surfaces of molars, for the reason that tin-gold remains soft and by mastication would be worn down. This is an incorrect statement, for the tin-gold needs no covering from gold to protect it. This material when correctly inserted will, in a short time, become so hard that it absolutely resists attrition. I have on the masticating surfaces of one of my molars a tin-gold filling worn for the past eight years, which has become as hard as stone and has not lost a single particle. I have only observed a loss on approximal, near the masticating surfaces, which I have traced to imperfect condensation of the material.

"The principal reason why I recommend the covering of tin-gold with gold in particular cases is that it makes a more beautiful operation, at least one that pleases the patient better; the filling may also be more readily built up (contoured) with a gold cap, and finally in compound cavities on the approximal and grinding surfaces the gold cap prevents the wearing away of the tin-gold above mentioned.

"The insertion and fastening of the gold pellets is accomplished by deepening the middle of the filling by the rocker or a simple plugger. The tin-gold must have previously been made dense with the mallet. For the filling of openings in the tin-gold, and for covering the latter, I prefer Wolrab's cylinder gold, Pack's pellets, or a good preparation of cohesive foil. I insert the material with the usual cohesive gold instruments, and condense with hand and mallet blow.

"Dr. Sachs (Breslau) fills large cavities upon the masticating surfaces of molars, where a pure gold filling is not possible on account of the proximity of the pulp, in the following manner: After excavating the soft tooth-tissue he covers the floor of the cavity with a thick cement layer, and makes use for this purpose of the so-called fluid zinc-phosphate filling of Poulson. This can be mixed so soft that it can almost be dropped into the cavity, a valuable property on nearly exposed pulps. This cement hardens in from three to five minutes, serving satisfactorily as an underlayer for a metal filling. He then removes from the side walls the overflowed cement, makes an undercut in the enamel border, and lays over the whole cavity a piece of tin-gold about twelve millimeters square. With a wide plugger he presses the material upon the floor of the cavity and in the side undercuts, and it is so arranged that on the sides it extends above the border. In the same manner he places from two to three pieces of tin-gold leaves of similar size in the cavity, and con-

denses the material. The tin-gold now covers satisfactorily the border, but is still deep in the middle. This depression Sachs fills with gold, and uses as the first layer Ad. Zur Nedden's crystal gold, which unites wonderfully with the tin-gold. He finishes with cylinders or leaf gold.

"The use of tin-gold is of great importance as a basis in cases where it is necessary to fill with gold and the approximal cavity extends under the gum border. All are aware of the difficulty and the pain connected with the placing of the rubber-dam, and how rarely in such cavities are teeth preserved by cohesive gold. To avoid the uncertainty and difficulty attending filling with gold at these parts, gutta-percha, pure tin foil, and also amalgam have been proposed. It is well known that all these methods have not proved satisfactory. Here is a place for tin-gold capable of doing good service, and it can be recommended as having no superior for this purpose."

*Experiments with the Tin-Gold Combination.*—"I come now to the close of my lecture, and have some experiments I have made with tin-gold to report. The mass is very hard, becomes stone hard, and in cutting is many times scarcely to be distinguished from amalgam. It is of interest to investigate the origin of this condition and what changes have taken place in both metals. It is usual to hear that the color of the tin-gold is due to the oxidation of the tin. It will show the incorrectness of this statement to say that oxide of tin is not black, but white. The following investigations are a contribution to clear up the foregoing. When a leaf of gold foil is laid between two leaves of tin foil and is brought into a one per cent. lactic acid solution and kept at the temperature of the blood for some hours, it will scarcely be possible to distinguish the gold from the tin. Some hours later the gold has a brown appearance, and the color changes gradually to bronze or black. In the solution is found a white flocky precipitate composed of oxide of tin, and upon the gold is found a layer of gray-black metallic tin. In the solution is found also much tin, but no gold in recognizable quantities. This appearance is produced rapidly in solutions of lactic acid, much less speedily in acetic acid, and not at all in butyric acid. It is produced also in hydrochloric acid and sulphuric acid solutions; in nitric acid there is comparatively no effect. If the examination is made under pressure, then both metals cling so firmly together that it is sometimes difficult to separate them. If a leaf of gold foil is laid singly upon a leaf of tin foil, only the under side of the gold will change color. If, however, a glass plate be laid over the sheet of gold, the upper surface of the gold will also be colored, but not so rapidly as the under side. My explanation of this result is the following. In the weak lactic

acid there is generated between the gold and the tin an electrical current, since the gold stands in electro-negative opposition to the tin, hydrogen collecting on the surface of the gold and oxygen on that of the tin. The oxygen unites with the tin as oxide of tin. The electro-positive oxide of tin is carried to the electro-negative gold, where it is by the hydrogen deprived of its oxygen and is precipitated upon the upper surface of the gold as metallic tin.

"The fact that the upper side of the gold leaf is not colored when free, but soon, however, takes on the color of tin when covered with an indifferent plate (glass). I can only explain by the supposition that the hydrogen, in the first case, quickly disappears after liberation, so that there is, therefore, no reduction of the oxide of tin. In the second case it will be held by the glass plate upon the surface of the gold, so that the effect is a reduction of the oxide of tin and deposit of the tin. The gold appears to suffer no change, and although in old fillings I have not seen a particle of gold under the microscope, yet by longer action of nitric acid (of 1.3 sp. gr.) it becomes perceptible. I have previously observed that the hardening of the tin-gold filling occurs more rapidly when the material is laid in moist than when it is condensed in the cavity dry. The inference drawn is, that with certain substances the electro-chemical union, as well as the hardening of both metals, is accelerated by the moistening of the tin-gold combination. Ad. Witzel was the first to make investigations in this direction. He immersed the first pellets of the tin-gold combination in a phenol-zinc-chloride solution. By the fact that the entire material was moistened in this manner, during condensation, with the metallic salt and by the pressing out by the first pellets, a more rapid hardening of the tin-gold was the result. I have tested these practical observations experimentally, and have found that the solution and precipitation of the tin upon the gold is very slightly accelerated through carbol, but very considerably by chloride of zinc.

"In regard to the expansion of the material after its introduction, it has been learned by experience that fillings which when polished were quite even with the edge of the tooth, were in some cases after months slightly projecting above the edge. From six glass tubes (of 5.0 mm. diameter and 0.6 mm. thickness of walls) which I filled with tin-gold, one exhibited a crack after three weeks' immersion in a bread and saliva mixture, the others remained intact after six weeks."



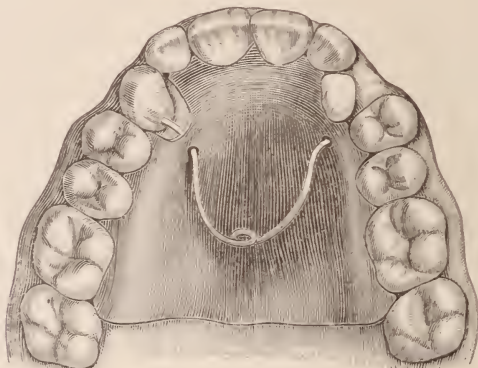
## COMPULSORY ERUPTION OF THE TEETH.

## II.

BY EUGENE S. TALBOT, M.D., D.D.S., CHICAGO, ILL.

A FORM of irregularity of the teeth is occasionally observed wherein the cuspids erupt inside the arch. Sometimes the case presents when the point of the cusp has just penetrated the mucous membrane of the mouth, and again the tooth will have erupted its normal length. Frequently it will erupt in close contact with the lateral incisor and first bicuspid, or it may make its appearance in the roof of the mouth. Occasionally only one cuspid will be misplaced. Again, both cuspids will thus erupt out of position. The object of this article is to demonstrate a simple and easy method of correcting these very complicated cases. Fig. 3 illustrates an

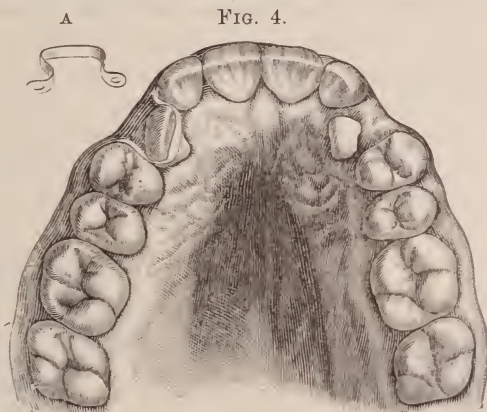
FIG. 3.



instance of the kind occurring in the mouth of a young lady sixteen years of age. Both cuspids were observed in process of eruption inside the arches, and in contact with the adjoining tooth. The roots could be outlined on the outer alveolar plate as far as their apices, demonstrating the fact that the crypts containing the crowns were originally in normal positions, but that their crowns had subsequently pointed toward the roof of the mouth. A vulcanite plate was made, and a hole drilled through it so that the point of a wire spring would touch the cuspid just above the margin of the gum. On the opposite side of the plate a hole was drilled just deep enough to hold the other end of the spring when in position. A small hole was then drilled into the enamel (but not through it) just above the margin of the gum, to prevent the spring from slipping when adjusted in position. A strong spring was made of piano wire, No. 17 or 18 U. S. gauge, and the ends bent at right angles. One of the ends was cut short to fit into the hole made in the plate opposite the

tooth to be moved, the other end left long enough to pass through the plate and sharp-pointed to enter a hole in the tooth to be moved. This very small hole was drilled in the enamel of the tooth, for the sharp point of the spring to rest in. In many cases such a spring will keep the plate in position, but should the plate slip it may be fastened to the bicuspid with ligatures.

Fig. 4 shows the same irregularity with a different appliance for bringing the tooth into place. This appliance is not my own idea, but I have been so successful with it for the past seven years that I deem it of value to the profession. It is made of German silver, which possesses all the requisite qualities. I have three thicknesses



of it ready for use, Nos. 29, 31, and 32, U. S. gauge. Strips are cut  $\frac{1}{16}$  to  $\frac{1}{8}$  of an inch in width, according to the strength required, and bent with small round-nosed pliers into the shape represented at A, to fit the teeth (Fig. 4). This is removed every day, and with round-nosed pliers the ends are bent, the spring shortened, and forced to place upon the tooth. This little spring acts in two directions: 1st, to carry the teeth laterally and thus provide room, and 2d, to draw the irregular tooth into position. This appliance can only be used when the crown of the irregular tooth is fully erupted. Teeth situated outside the arch may be thus brought into line as well as those which are situated inside. In the latter case it is necessary to wear a plate to keep the jaws apart while the tooth is in transit.

### "GUM-COLORED PORCELAIN FILLINGS."

BY J. M. COMEGYS, M.D., ST. ALBANS, VT.

APROPPOS to the paper with the above title, read before the Chicago Dental Society by Dr. A. H. Thompson, of Topeka, Kansas, and the discussion which followed, as reported in the March number of the

DENTAL COSMOS, I shall beg leave to share with Dr. Thompson what of honor there may be in the conception of the use of gum-colored fillings, though my process is somewhat different, as the following case, inserted last September, will show.

Miss H., about thirty-eight years of age, salivated; effects most marked at the left inferior cuspid. On its labial aspect the gum had receded quite badly, exposing the root nearly or quite half-way to its apex. The front was also decayed from within about two lines of the cusp to a point a trifle below the margin of the gum, and so extensively as to involve the pulp, which at the time of presentation had long been devitalized. Subject showed her teeth considerably, and the decay, added to the recession of the gum, rendered an otherwise attractive face quite unsightly. Fig. 1 represents a cast of the case after the cavity was prepared for filling; the method of preparing the filling being similar to that of Dr. Thompson. For the pin I used platinum and iridium, it being stiffer than platinum alone. This was soldered through the platinum foil before it was burnished into the cavity, one pin-end fitting nicely the nerve-canal, the other allowed

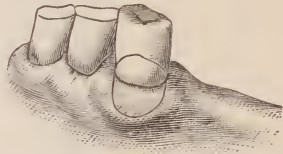
FIG. 1.



FIG. 2. FIG. 3.



FIG. 4.



to project enough above the foil to be thoroughly invested by the porcelain. After being burnished in place the shell appeared as shown by Fig. 2. After being filled with porcelain body to match as nearly as possible the shade and contour of the tooth, it was fused in the "Land" furnace. (Let me here suggest that if one will have a small quantity of the different shades and combinations of shades of the porcelain body fused so as to carry to the patient's mouth and use as samples, the work of matching will be very much simplified, and the resemblance beyond criticism by anyone not a dentist.) Without removing the platinum the filling was placed in position, while with a pencil the normal festoon of the gum was traced on the porcelain, then removed from the mouth, and enough gum enamel fused on to conform to the natural outline of the gum. In this state the filling presented the appearance of Fig. 3, and when the platinum was removed and the filling cemented in place, the tooth presented the appearance shown in Fig. 4.

Although I have never attempted the work as suggested by Dr. Thompson, I am of the opinion that more artistic work can be done by the above method than by the grinding down of a porcelain sec-



tion. Certain it is, there is much less loss of tooth-substance, while it is quite as strong, as the adaptation is much more perfect; it is also much less tedious to the patient, as nearly all the work after preparing the cavity is accomplished in the laboratory.

I will add, for the benefit of the younger portion of the fraternity, that the above-mentioned lady, who lives many miles from my office, told me at the time of her visit in September that she had been to me at four different times within a few years demanding the extraction of several of her teeth, and I had every time refused and recommended their salvation. Although quite bad teeth to restore, they were during the time of the above operation put in condition to give her many years' service and comfort.

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## PROCEEDINGS OF DENTAL SOCIETIES.

### NEW YORK ODONTOLOGICAL SOCIETY.

THE New York Odontological Society held its regular monthly meeting in the parlors of the New York Academy of Medicine, No. 12 West Thirty-first street, on the evening of February 19, 1889.

The vice-president, Dr. C. A. Woodward, in the chair.

#### INCIDENTS OF OFFICE PRACTICE.

Dr. Geo. S. Allan. I would like to say a few words on a subject in which we are all greatly interested, and if the line upon which I have been working results as successfully in the future as it has in the short time I have pursued it, I think that it offers a field for a great deal of satisfactory work in very difficult cases. I allude to pulpless temporary teeth. If there is any one class of cases that has been a little more annoying, more troublesome, and more difficult to obtain satisfactory results in than another, I think it is this class. We are debarred, of course, from anything like thorough root-filling, and we are constantly getting into trouble. A few months ago I had a patient, seven years of age, in whose mouth there were five or six pulpless temporary teeth, among which were the superior temporary cuspids, the roots of which were hardly absorbed at all. The child, a girl of rather weak constitution and anemic condition, was not a favorable subject. She had been abroad for a couple of years, had neglected her teeth considerably, and I found this condition when she returned. Those two cuspids, of course, she ought to keep for five or six years. I made a mistake in saying they were both dead; one was pulpless, in the other the pulp was badly exposed. After treating them and thinking it over, I tried this experiment: I extracted the dead pulp, as I would that of any permanent tooth,

taking the greatest care to keep the fluids of the mouth from gaining access to the canal. I washed out the canal with a weak solution—one part in one thousand—of mercury bichloride, dried it thoroughly, then washed it out with absolute alcohol, and immediately closed up the open end of the pulp-chamber with a little gutta-percha, warmed and touched with resin and ether to make it stick. I then filled the cavity with gutta-percha. Now if I have been sufficiently careful in my work so that all germs have been excluded, especially those likely to induce putrefactive conditions, I see no reason why that tooth should not remain in a comparatively healthy condition and free from inflammatory conditions for some time to come.

The tooth that had the exposed pulp I treated in much the same way, and used the same antiseptics. The pulp was so badly exposed that it seemed almost folly to attempt to do anything with it; but I could only fail. The result is that neither of those teeth have troubled the child from that day to this. Since then I have followed that line of treatment in two other cases, and apparently with success.

This method of procedure for the treatment of pulpless deciduous teeth seems to me to offer the best substitute for root-filling, as employed in permanent teeth, that can be adopted. I bring it before the society, not that I claim that it will be a perfect method of treatment, but in the hope that some of the members will try it, varying it, of course, as circumstances may suggest, and using different antiseptics, but following this fundamental idea. I think a good substitute for mercury bichloride would be some of the essential oils, such as oil of cloves and oil of thyme. I have used the latter with a great deal of success.

Another class of cases where the same line of treatment would seem to be indicated is that of small molar and bicuspid roots. Some dentists say they can fill them all. I cannot. But if I can sterilize them and then close them, I can see reason to hope for a large measure of success in this method of practice. The rationale of the plan suggested is manifest. The pulp-canals gradually fill up with blood serum or some exudate, but as all germs contained therein have been destroyed and others excluded, no decomposition or putrefaction takes place. A like conclusion is frequently observed in other parts of the body, notably in the fluids contained in cysts and tumors and the amniotic fluid.

I would here say that I use mercury bichloride rather freely. It is one of the most common germicide agents that I now have in my office. I keep a one per cent. solution, and when wanted I dilute it with rose-water instead of ordinary water, and the disagreeable

taste which the patients complain of so much is prevented. An abscess cavity, or the deep pockets in cases of pyorrhea alveolaris, can be syringed out and the patients will hardly notice the taste; whereas before I used the rose-water they would grumble exceedingly about the horrible bug-poison taste of the bichloride.

Dr. Woodward. Is there any advantage in using a stronger solution than one to one thousand?

Dr. Allan. I have seldom used it stronger than one to one thousand. In pulpless roots I use it stronger, even a one per cent. per hundred, but not to wash out a pocket, or anything of that kind; in such cases I never use it over one to five hundred, more frequently one to one thousand, or even one to two thousand.

Dr. C. D. Cook. During the last year or two copper amalgam has been much used and talked about as a filling-material, and as so much is said for and against its use, I thought that perhaps it might be of interest to call the attention of members of this society to some experiments recently made with it by Dr. W. St. George Elliott, of London. We all, no doubt, have been under the impression that copper amalgam did not shrink in setting, that in fact it made a perfectly water-tight filling. From those experiments of Dr. Elliott's it appears that we have been misled in that particular, he having shown that copper amalgam shrinks much more than several of the silver-tin alloys. He tried four modes of ascertaining the shrinkage: fillings made in celluloid, human teeth and glass tubes, and the specific gravity test; this last being the only one which he considers of much value. Twenty-four experiments were made with tubes, twenty-one of which were copper amalgam and three silver-tin alloy. All the copper amalgam leaked, allowing the red ink to pass, while the silver-tin alloy proved fairly tight. According to Dr. Elliott, most of the shrinking takes place during the first twenty-four hours; subsequently the filling seldom remains the same any length of time, shrinking and expanding in a small but measurable quantity. Not only does the result of these experiments show that the best copper amalgam shrinks four times as much as the silver-tin alloy, but Dr. Elliott also found that the silver-tin alloy had much greater edge-strength than the copper; in spite of which he thinks copper amalgam is a material of considerable value as an antiseptic in the stopping of teeth of a poor structure.

Dr. A. H. Brockway. I do not like to question the accuracy of Dr. Elliott's experiments, but so far as my observation goes, whether or not copper amalgam shrinks when tested in this manner, it does make a very desirable filling when placed in proper cavities in teeth; and that fact is the main point which we need to determine. I have been in the habit of using copper amalgam occasionally for



some years, especially in buccal cavities of molar teeth, and I have found nothing that seems to answer the purpose so well. There may be shrinkage, and it may shrink more than the alloys of silver and tin, but it does not show it. The joints seem to be far more perfect after the lapse of months than in fillings made of the ordinary silver and tin amalgams.

Dr. Cook. There is another point made by Dr. Elliott. In some of the directions given for using copper amalgam it is suggested that directly the little bubbles of mercury appear on the surface of the mass, the material should be put into the mortar and prepared for use. Dr. Elliott says this is an error; that we should wait until the mercury is thoroughly thrown out from the mass before crushing it in the mortar, which will give better results. It is also claimed that the amalgam does not deteriorate by being laid aside after mixing, but that it is just as good, or possibly better, after having been worked over several times.

Dr. S. E. Davenport. Four years ago a lad about eight years of age was in my chair, with both superior sixth-year molars badly decayed on their buccal surfaces, the cavities also extending into the crowns. They were soft teeth, and the cavities, although not excessively large, were easily increased in size by the cutting-instruments, the tooth-structure having the feel of chalk, or hard cheese. Not liking to spoil the shape of the teeth forever by cutting away all the softened structure, I compromised by taking away only that which was exceedingly soft, leaving much that was discolored and apparently breaking down. I must confess to being fearful of the result of this lack of thoroughness, but I knew the lad would report in a few months, and it seemed an excellent opportunity to test the copper amalgam with which I decided to fill the cavities. I instructed the boy carefully in regard to additional care in cleansing his teeth, and sent him away with my best wishes. Whether it was the better care which the boy gave, or the effect of the copper amalgam, or both, I cannot say, but it is certain that I was not only delighted, but surprised, at the almost miraculous change in the structure of those teeth when I saw them say six months later. Upon careful examination the margins of the copper amalgam seemed to be almost perfect, and that portion of the tooth which could easily have been cut before was then quite hard, and had the ringing sound of at least a fair quality of tooth-structure. This report does not all depend upon my memory. I was so impressed with the peculiar character of those teeth that I wrote upon a page of the ledger my comments and prophecies in the case. Those prophecies have not been fulfilled, for the teeth are being preserved by those fillings.

Dr. Lord. Will Dr. Davenport please give us his experience in regard to the shrinkage of copper amalgam?

Dr. Davenport. I have made no experiments which would be at all scientific or conclusive in reference to the shrinkage of copper amalgams, but my belief is, as Dr. Brockway's seems to be, that the shrinkage, if present, does not show itself upon ordinary examination, and apparently does not interfere with the successful offices of the amalgam. To the naked eye its margins, months and years after insertion, in the majority of cases, seem to be in better condition than the margins of any other amalgam which I have either used or had an opportunity of examining. There seems to be a peculiarity of copper amalgam which is met with, I am sorry to say, in an occasional lot, which enables it to be worn away by trituration, or possibly by some solvent action. Such fillings present a scooped-out or concave appearance, even though the edges of the cavity may still be covered by the material. I have given quite a little thought and study to that point, and although I have used the amalgams of several manufacturers I have not been able to decide that this peculiarity was confined to any particular kind of copper amalgam, or any particular make; it seems to be present in occasional lots of all the kinds that I have tried. Possibly the manipulation has something to do with it. There is one advantage that all these concave fillings which I have seen possess, and that is a light color. I have yet to see a wasted filling jet black, which may only mean that such a filling is constantly losing from its surface.

Dr. Dwinelle. I would like to ask Dr. Davenport what his experience has been with reference to the discoloring quality of copper amalgam, and how it compares in that respect with other amalgams.

Dr. Davenport. I do not feel competent to speak as an expert upon these questions, but as far as my observation goes I should not hesitate to use copper amalgam in any tooth which was very much in need of being saved, or in teeth even of a better class where the filling would be out of sight; and I do not think it discolors the dentine more than other amalgams do. It being blacker, its use in transparent tooth-structure would probably cause the teeth to have a darker appearance, but I do not think the dentine is permanently discolored by it.

Dr. Lord. The results of Dr. Elliott's experiments are certainly very different from what we have previously understood in regard to the shrinkage of copper amalgam. Perhaps we have not used it long enough to determine its properties. As far as my observation and experience go, it does not, apparently, shrink any. As has been remarked, the margins of fillings have remained perfect for the time that I have had opportunity to see them, which is only about

a year and a half; but it has been my understanding from those who have used it for a longer time and have tried various experiments with it, more particularly Dr. Bogue, that it does not shrink. In the experiments made by Dr. Elliott the amalgam may have been treated differently; and I should say that if it is heated until the mercury has all evaporated it would be next to good for nothing. I should suppose it would be a great deal better to crush the mass as soon as it is sufficiently softened by the heat, and then, if there is any surplus mercury, press it out by some means, either with the thumb and fingers or with pliers. That has been my practice. Many gentlemen who have used copper amalgam very much longer than I have, seem to have the same experience and observation in regard to its not shrinking. I think it is our understanding generally that it does not shrink.

Dr. Cook. I think Dr. Lord has misunderstood me in regard to evaporating the mercury. I did not say "evaporate," nor does Dr. Elliott. He says heat it until the mercury is thoroughly forced from the mass. Possibly some of the specimens do not contain sufficient mercury to make it plastic, in which case mercury should be added. Another point that Dr. Elliott makes is that the walls of cavities should be square, not beveled, in order to insure the best results; that where there are beveled edges there will be leakage. These trials are not made in the mouth; they are made out of the mouth, in a temperature of one hundred degrees, and in the most careful manner.

Dr. Allan. Can any one tell us exactly what copper amalgam is composed of, and the proportions?

Dr. Cook. I understand it is absolutely pure copper, or as near as it can be made, precipitated by a galvanic process upon zinc or iron plates, and that the amalgam is composed only of copper and mercury. Possibly a gentleman whom I see in the other part of the room can give us some light on the subject of copper amalgam. He has had some considerable experience with it in South America.

Dr. Louis Shaw. I cannot add much to what has been said. I have known copper amalgam fillings that have been in the mouth twelve years and which showed no shrinkage whatever. As to the manufacture of copper amalgam, it may be precipitated upon either iron or zinc plates, and afterwards acids are used to remove the iron or zinc, which leaves the pure copper. I think there is a little knack in driving out the mercury from the mass. If the amalgam is crushed as soon as the globules of mercury appear on the surface, the results will not be as good as they will if the amalgam be heated an instant longer; if it be heated too long, mercury is driven off and the result will not be satisfactory.



Dr. Jackson. I would ask whether it is best to work the amalgam rather dry, or quite plastic.

Dr. Shaw. I think it is best to work it plastic. As a rule, copper amalgam contains too much mercury. The more mercury that can be pressed out of the mass and yet have it remain plastic, the better the amalgam will be. The oftener it is worked over and the mercury pressed out, the better it is; and the scraps that are saved are better filling-material than the original mass. As a usual thing, the precipitate of copper is not sufficiently purified from the iron or zinc. That which we get from England contains an appreciable quantity of iron or zinc, according to the method by which it is made. The best copper amalgam contains nothing but absolutely pure copper. I believe that that which is deposited by electricity, without the intervention of either iron or zinc, makes much the best copper amalgam.

Dr. Cook. Judging from my reading and from what I have heard, I am under the impression that copper amalgam does not stain dentine any more than the silver and tin alloys do; certainly not more than the old coin alloy that was used twenty or thirty years ago, and which was made of the fillings of old Spanish silver coin. I have understood from Dr. Shaw, who has just spoken, that he has seen many fillings of copper amalgam which did not discolor the dentine or the enamel at all.

Dr. Dwinelle. The swelling and shrinking of amalgam is surprising, and I think oftentimes we are more troubled with its swelling or bulging out, and projecting beyond the borders, than by its shrinking.

Dr. Cook. I have made no experiments, and only judge from general observation and the testimony of others, which is that amalgams do not remain in their original state constantly, but are changing from time to time during months and years. I believe it was demonstrated by the late Dr. Thos. Hitchcock and others that there is a molecular change constantly going on in amalgams.

Dr. Dwinelle. I know less about copper amalgam by personal experience than I do about the ordinary amalgams that have preceded it. I think we are very far from having reduced the manufacture and manipulation of amalgams to an exact science, for when they are treated, seemingly, in precisely the same manner, different results are produced. I saw a few days ago, in a mouth where I knew positively that I had placed the same kind of amalgam in different teeth, and treated it precisely alike in all of them, some of the fillings as black as a coal, while others remained bright and as nearly the color of the tooth as an amalgam can approximate to it. Otherwise they were in the same condition as when I put them there. I think the amalgam problem is a hard one to solve. I have had large

experience with it, and yet I never can feel certain of getting the same desirable results in every instance. Sometimes the mass, a long time after being inserted, will suddenly take on a disposition to swell and will be found to project beyond its borders to a considerable extent. So this is a very important question in connection with copper amalgam. It has been my habit to obtain the best amalgams, if possible. In one instance it was stated that I had said a certain amalgam was the best in the world. I certainly never made that indorsement. I do not know what is going on the laboratories of the moon, or at the extreme of our earth. I have always been in the habit of washing my amalgam with carbonate of soda, and I find the quantity of foreign matter, sometimes oxides, almost twice as great in some amalgams as it is in others. I have been enabled in some cases to extract at least a quarter of the weight of the mass by washing. I have seen some copper amalgam fillings that were exceedingly black, and yet they preserved the teeth, and I have seen others that showed a disposition to waste away, and stain the teeth. I do not understand its action.

Dr. Lord. I hope we will have the pleasure of hearing from Dr. Bogue on this subject of copper amalgam, especially in regard to its shrinkage. He has had a great deal of experience with it, and I see he has just come in.

Dr. E. A. Bogue. Dr. Cook informed me that he was expecting to offer a few words on this subject to-night, so I looked over the published remarks of our friend, Dr. Elliott, before coming here, and I also have here a little article which follows Dr. Elliott's in the *Dental Record*, of England. The article referred to is by C. Boyd Wallace, D.D.S., and although he goes over Dr. Elliott's ground somewhat, I do not think we can do better than to take the salient points of it. Dr. Elliott says it makes little difference whether the copper is precipitated upon iron or zinc. Dr. Wallace shows that it does make a decided difference, and that the precipitation upon iron makes a much harder and a much lighter colored material. Dr. Elliott offers some very convincing arguments through these experiments in favor of the existence of shrinkage in copper amalgam. My own experiments, made many years ago, were made with an instrument for measuring expansion and contraction, which, although fairly delicate, does not give the most infallible test. One feature of the instrument was a spring which pressed against the substance. I found no shrinkage either in copper or palladium when measured by that instrument, but I did find shrinkage in every other amalgam that I tested. A point which bears upon a theory advanced by Dr. J. Smith Dodge, Jr., some years ago comes to me. We all know how every fluid tends by gravity to take the form of a sphere.

Mercury is no exception. If we add a certain amount of any metal for which mercury has an affinity, it is little less spherical. Add more, and it becomes like a cheese. Add more, and it becomes a pasty mass, with round corners or edges.

As far as copper is concerned, I cannot add anything to the experiments already offered, beyond the pamphlet by Dr. Wallace. I would like for one moment to turn to another subject, and to show the gentlemen something that was handed to me on the other side of the water, and which may be of interest. My old associate, Dr. Rogers, was called upon to supply a nose, and he has done it in a manner which to me was quite unusual, though very effective. It is made of thin, flexible rubber, almost flesh color. With this arrangement the young lady is able to visit her friends and make quite a respectable appearance. The ingenuity of the restoration was so great that I pocketed this one to show to the society.

Vice-President Woodward. If there is nothing further to be said on this question, we will listen to the paper of the evening, by Dr. I. B. Davenport, of Paris, entitled "Non-Cohesive Half-Cylinder and Loop Filling."

Dr. S. E. Davenport. When Dr. Davenport, of Paris, was in this country last autumn he exhibited the method herein described before a few gentlemen who were kind enough to come together in Dr. Bogue's office. This paper was written about that time, and left in my hands for the Odontological Society.

[The paper was here read by Dr. S. E. Davenport.\*]

Vice-President Woodward. The paper which you have listened to, gentlemen, is one which I know you are all interested in, and I trust there will be a full expression on the subject.

#### *Discussion.*

Dr. Dwinelle. The subject is certainly a very interesting one, and I hoped it would call out the enthusiasm of every member. I am too ill to speak myself, but I cannot well bear to have silence reign where excitement and interest ought.

The subject of filling teeth with gold is certainly the foremost one with us all. I have no doubt that very good fillings can be made with non-cohesive half-cylinders in the manner described, by skillful operators. My former experience was mainly with non-cohesive foil. All the early members of the profession knew nothing about cohesive foil as a filling-material in general use. We sometimes had the misfortune to have sticky gold sent to us, simply because the

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\* See page 338 of this number of the DENTAL COSMOS.



gold-beaters had made it so by accident, not knowing the principles that govern the metal, not knowing the fact that absolutely pure gold contained the inherent quality of cohesion. The profession was never supplied with cohesive gold until latterly. When it was found that absolute gold contained the quality of cohesiveness, then we had a standard to work upon; by a system of alloying we are able to graduate it so as to have every quality from non-cohesiveness to absolute cohesiveness. The principles which govern the filling of teeth we all know are the hermetical sealing of the cavities to exclude the foe without, and the selection of materials which by their solidity will afford protection and endurance to the tooth. Formerly my system consisted in knitting together the material by means of minute points, *absolute* points, and I was thus enabled to produce consolidation without the principle of cohesion.

I merely rose to start the ball, gentlemen, and I hope I shall be followed by others more capable of enthusiasm to-night.

Dr. C. F. Ives. I had the pleasure of seeing Dr. Davenport insert one of these fillings during his visit here, and although it was a simple crown cavity, reaching over to the buccal aspect of the tooth, I was impressed with two things particularly in the operation: first, the ease and rapidity with which he inserted the filling, and second, its solidity when completed. There was very little malleting done. He asked me to test it; and, taking a small pointed plugger and using what we used to call the "Chicago jerk," which is very effective and searching, I felt around the margins for imperfections, and was perfectly dumfounded by the solidity of the structure. It was made almost exclusively by hand pressure, and seemingly very little of that. It was but slightly condensed, but it was amazing to see the solidity of it. The "Chicago jerk" of which I spoke is something like pounding your elbow into your side, with the point of the instrument placed firmly on the gold. It is difficult to understand that mode of filling without seeing it, and I doubt whether any clear-cut plates would give a correct idea of it. What is needed is some of Williams's cylinders, cut through the center with a sharp lance, and the practical filling of one or two cavities, following carefully the instructions given in the paper. The knowledge thus gained will enable any operator to understand the method and its advantages.

Dr. Brockway. I wish to add my commendation of that paper. It strikes me as being an admirable and philosophical method of manipulating non-cohesive gold, and the wonder to me is that some one has not worked it out before. However, in that respect it differs from no other discovery. When a new thing is done and demonstrated, every one is apt to think he might have done it himself. I

think I can comprehend the method of operation from the paper itself. It seems to me that it has been so clearly set forth that even the addition of cuts would not be necessary to enable me to understand it and to put it into practice. I have gradually been abandoning to some extent the use of cohesive gold, especially in cavities of much depth. I have experienced the difficulty in using cylinders which Dr. Davenport has so clearly pointed out, and I see now where the defects occur in the use of ordinary cylinders; but I see too, or think I do, that those defects can be almost wholly overcome by the ingenious method which Dr. Davenport has supplied.

Dr. Lord. This subject certainly opens a wide field, an immense field, and it would be an excellent thing, I think, if we could defer the discussion of this paper to another evening, and then come prepared to discuss it. It would be very delightful to hear from these young men and have them tell us how they fill teeth, after the results of the experience of those who have been filling teeth for from forty to fifty years,—after what they have seen and read and learned of how teeth were filled in what we might say was the olden time. I am sure it would be very interesting to those of us who are older.

I think we are very much indebted to Dr. I. B. Davenport. This is not the first paper of very great interest that he has given to us. We certainly ought to give him our most hearty thanks, and our earnest good wishes that he will go on upon the same line. A man who has thought as much as he has, and given us so well the results of his thought, will not stop here; he will no doubt be heard from again and again.

I do not think, Mr. Chairman, that we yet know what can be accomplished with soft foil. I do not think we yet realize what can be done with it. And I do not think we have used the right kind of instruments, a great many of us. I remember to have asked Dr. Dwinelle, about fifteen years ago, in a room over a restaurant where we had gone to lay off our coats, what kind of point he used in packing foil, and he said, "I use an absolute point." I tell you that opened my eyes wider than they were ever opened before as regards the point for packing gold, and I have felt all these years that I could make better gold fillings from having heard it said that an absolute point was the point to use.

I have sometimes thought it would have been better for our patients if cohesive foil had never been discovered or introduced. Not but what it is very useful, and a very important preparation of gold in some of our work, but in the majority of cases I do not believe it is as good, I do not believe that teeth can be filled as accurately or as easily with it as with soft foil; therefore it has been an injury rather than a benefit. I think so. Others do not think so,

and that shows how we differ; and it shows also that as individuals we get satisfactory results in different ways, because no man would wish to go on in a particular line of practice unless he did get satisfactory results. If he does go on and is not satisfied, he had better stop. There is no doubt but that a great many do get very excellent results, perfect results I may say, with cohesive foil, but I think it is a great deal more difficult to use, and a great deal more uncertain, than soft foil.

I am sure there is not time at this hour to discuss this question, because it opens up too wide a field, not only as to the particular way in which foils should be prepared for use, but in the way we pack them.

Dr. V. H. Jackson. I am very much interested in the subject before us. I have been using cohesive foil almost entirely since I began the study of dentistry. Have used soft foil to line cavities in frail teeth, finishing with cohesive gold with good results. I am convinced that we frequently cut away tooth-structure too extensively for the purpose of using cohesive foil, which could in many cases be avoided by using non-cohesive foil. I therefore favor the use of non-cohesive foil in appropriate cavities in soft teeth where a highly finished filling is not required.

I would be glad to hear more remarks upon the best methods of inserting non-cohesive foil.

Dr. Lord. I think we could get the same result that Dr. Davenport gets with half-cylinders, by the use of flattened ropes, cut in suitable lengths, and folded strips. Even with strips of non-cohesive foil we can contour to an astonishing extent, if we use the right kind of points.

Dr. Cook. A subject which I have never had the pleasure of hearing discussed in a dental meeting is that of the use of soft foil in our dental schools, and I do not know of one school in this country that pretends to teach its students how to use soft foil. I have been acquainted with several graduates of these schools who did not seem to know how to use soft foil; and I have one in mind who had no idea of it whatever until I told him something about it. In putting on a rubber-dam, and some other things, he could teach me much, but he knew nothing about the use of soft foil, and could scarcely fill a crown cavity without a rubber-dam. The use of a napkin or bibulous paper, and other devices that we had for keeping a cavity dry twenty years ago, he knew nothing about. For the last twenty years our schools have, so far as I know, taught the use of cohesive foil, amalgam, and sometimes tin. The students have been told theoretically how to use soft foil, but have not practiced it. I do not know that it would be the best way, but it would



be a way that I should adopt if I were a demonstrator in a dental school, to teach students how to use soft foil first. And I would have them know how to keep a cavity dry without a rubber-dam. They might have to fill a cavity some time when it would not be practicable to adjust a rubber-dam. Such teeth can be filled without a rubber-dam, and can be saved even if filled under water, when filled with soft foil. It seems to me our schools might well be touched up in that direction, that they might educate their students in the use of soft foil. I know they did not teach it in the Harvard school, and I think it is not taught in the other schools. Most of the teachers in the schools have been educated within the last twenty years. I do not suppose that Dr. Flagg, of Philadelphia, teaches his students how to use soft gold, inasmuch as he does not use it at all himself.

Dr. J. Bond Littig. I do not know a great deal about the operative department of the New York College of Dentistry, other than as a buyer of materials used there. I hold in my hand now an order which reads, "Please send me some soft foil for the infirmary." I furnish equal lots of soft and cohesive foil to that infirmary. How it is used I do not know; but I think the students must be taught the use of soft foil, otherwise they would not demand it.

Dr. Cook. Does Dr. Littig know that his soft foil is not used as Dr. Allport, of Chicago, uses it, first putting it through the flame of a lamp? I do not call that soft foil. What I mean by soft foil is that which is absolutely non-cohesive, and not heated at all. A great deal of the so-called soft foil that is now used is first passed through the lamp flame.

Dr. Littig. As before stated, I know nothing about the teaching or using of soft foil in the college, but my opinion is that if they did not use soft foil as such they would not desire both kinds of foil every month, because the cohesive is already annealed. I have used soft foil for a great many years, and think I know pretty well how to manipulate it. It was the only way that I was taught to fill teeth with gold in the Baltimore College. We knew nothing about cohesive foil at that time. It was on the old wedge principle, that Harris set forth, that we were taught to use foil.

Dr. Wm. B. Davenport. In reference to Dr. Cook's remarks as to the teachings of dental colleges, I can say that I was instructed in the New York College of Dentistry to use soft foil, and also to use napkins in preference to the rubber-dam in the majority of cases. In my present practice I find these teachings of great value when rapid work is required or when it is necessary to spare the patient all the discomfort and fatigue possible, also when operating for children.

Dr. Dwinelle. The term soft foil is subject to modification. Soft foil, pure and simple, was furnished us forty years ago by Bull, Abbey, and other manufacturers. If Abbey's old-fashioned soft foil be placed in the lamp flame it will not become cohesive at all; on the contrary, the heat makes it hard and arbitrary in its working quality. Most of the soft foil of the present day has the quality of cohesiveness when it has been passed through the flame. Dr. Dunning, who was one of our professors in the New York College of Dentistry in its first days, once gave us an essay entitled "Perception at the Point." It was a fine text to preach a sermon upon to us at that time; perception of all the different parts, characteristics, and modifications of the cavity to be filled, perception and clear intelligence at the point and of the point as it carries the gold to its destination. I have been in the habit of using absolute points during all my professional life,—which, by the way, commenced fifty years ago this month. I had the pleasure, a few summers ago, of visiting my old country town and my old homestead, and there I met the first patient that I ever operated upon. She is living now. I knew I had filled her teeth with Abbey's foil, or perhaps some of the old Bull foil which preceded Abbey's; I would not be surprised if I had used both those kinds of foil in her teeth. In those days, before the bur engine dawned upon our horizon, we filled teeth as well as we could with the instruments we had, and finished and burnished fillings as the circumstances permitted, but we were never able to give them that completeness which has been made possible by the use of the bur engine. I took this lady down to my old office where her teeth were filled so many years ago, and there I had the pleasure of finishing and polishing the fillings that I had put in nearly half a century before. I was surprised and delighted, gentlemen. I hope it is not all vainglory to relate this simple fact, but I found those fillings so hard and solid that they were capable of being finished down like modern ones. I could not wish them to be any better. It was an interesting little episode in my life, that I had commenced this work nearly half a century ago and had the pleasure of living long enough to finish it.

With regard to the point that our worthy friend, Dr. Lord, referred to: the first thing that suggests itself upon the advancement of the idea of the absolute point is that you cannot use an absolute point because it would stick through the foil; but if the point be made at a certain angle in the form of a truncated cone, gold can be carried anywhere with such an instrument with perfect security and certainty. I have different sizes and gradations of these instruments, which I bring down with a hone to an absolute point on its four sides at a certain angle, then turn up the instrument at another angle, giving

it the form of a truncated cone, which gives the instrument its carrying quality.

Dr. Brockway. Are they smooth, or serrated?

Dr. Dwinelle. The instruments referred to are not serrated, though I have used serrated instruments more or less. With the absolute point and hand pressure we are enabled to give a great solidity to fillings that no other process will give; often a force of thousands of pounds to the square inch may be obtained. But I will waive the point, and let the point be pointless until a better opportunity offers.

The secretary announced that Dr. Brasseur, of Paris, a gentleman of advanced and liberal ideas and high literary attainments, had recently died after an illness of but a few hours; the dental profession of Paris thus losing one of its most prominent members.

Dr. Dwinelle. Mr. President, I move that a vote of thanks be extended to our friend and confrère in Paris, Dr. Davenport, who is also an honorary member of this society, for his excellent and lucid paper to which we have listened this evening.

Dr. Dwinelle's motion was carried unanimously.

Dr. C. D. Cook. It is my painful duty to announce that since our last meeting Dr. Flavius Searle, of Springfield, Mass., an honorary member of this society, has passed away. He was a distinguished member of the profession, and was very much respected and esteemed.

Vice-President Woodward. Gentlemen, it is with deep regret and a full appreciation of our loss that we hear the announcement of the death of Dr. Flavius Searle. For many years Dr. Searle was an associate member of this society, and at our last annual meeting he was unanimously elected to honorary membership. Dr. Searle's services to the profession were many, and his life was singularly upright and conscientious. The executive committee will kindly prepare suitable resolutions, so that our minutes may express the deep sorrow that we feel.

The executive committee through its chairman, Dr. C. D. Cook, subsequently presented the following resolutions on the death of Dr. Searle:

As this society has, since its last meeting, lost one of its honored members by death,—Dr. Flavius Searle, of Springfield, Mass.,—we desire to express to his friends and relatives our deep appreciation of his professional character, his scholarly attainments, and of those qualities which have so endeared him to us as a friend that we felt ourselves honored by his membership among us.

In Dr. Searle's death our society and the profession for which he did so much during his more than fifty years of practice sustain an irreparable loss.

*Resolved*, That a copy of the above expressions be sent to Dr. Searle's late home, and that they be also spread upon the minutes of this society.



Dr. Brockway. I indorse the resolutions, and move their adoption. I had some personal acquaintance with Dr. Searle, not very intimate, but extending over a number of years. He impressed me as being a man of singular purity and uprightness, and I always felt that it was a sort of benediction to have him speak to me. The last time I saw him was at the great meeting of the Massachusetts Dental Society, held in Boston last July. The fact of his being in attendance at that meeting, a man of his age, showed that he had lost none of the interest which he had for so many years shown in his chosen profession. I am glad that this society has given this expression of respect for so honorable a man.

Dr. Dwinelle. I would like to add a word to what has been said by Dr. Brockway. I knew Dr. Searle for many years. I only saw him occasionally, but whenever I did I found that we were capable of taking up the subject that we had discussed at the time of our previous meeting and going on with it as though there had been an interruption of but a few minutes, instead of seven or eight years. I can testify to his genial nature, sweet temper, and loving disposition, and that he was one of the most upright of men. Although a man of but few words comparatively, yet his genial nature shone out through those few words which he did utter in an unmistakable way.

Dr. Searle was a credit to our profession in those early years when we needed such men and their indorsement. He made his calling reputable, and made the character of our profession what it is to-day to a very large extent. The indorsement of such men, of unimpeachable integrity, intelligence, and genial, loving natures, shed light upon and gave credit to our calling when we were few in numbers, and to him we owe much in this direction. He attained to an advanced age, and he was always an object of solicitude and tender care on the part of those who knew him best, and who had received personal evidence of those good qualities. So we may say of him, as was said of another not more distinguished, perhaps, in his career,—

“None knew him but to love him,  
None named him but to praise.”

The resolutions were adopted.

Adjourned.

S. E. DAVENPORT, D.D.S., M.D.S.,  
*Editor New York Odontological Society.*

## FIRST DISTRICT DENTAL SOCIETY, STATE OF NEW YORK.

THE First District Dental Society of the State of New York held a regular monthly meeting, Tuesday evening, March 12, 1889, in the New York Academy of Medicine, No. 12 West Thirty-first street.

The president, Dr. W. W. Walker, in the chair.

Dr. M. L. Rhein, chairman of the Clinic Committee, read the following

## CLINIC REPORT.

A stated clinic of this society was held this afternoon at the depot of The S. S. White Dental Manufacturing Co., Broadway and Ninth street.

Dr. E. P. Brown, of Flushing, L. I., exhibited a lady with the first superior left bicuspid crowned and alongside of it a bridge of the left superior cuspid and lateral, fastened by a pin in the cuspid root and by a bar filled in a large approximate cavity in the left superior central incisor. The teeth all bore heavily on the gum-tissue, which had come over them sufficiently to make a very beautiful result. He also constructed a bridge consisting of four teeth. A gold crown was made to fit the second superior left molar, and a platinum-iridium bar, long enough to be anchored in the posterior approximate surface of the cuspid, passed through the porcelain attachments which united it to plain plate teeth, and a Brown crown which served as an extra abutment was anchored into the root of the first bicuspid. The gold crown has an aperture on the anterior approximate surface, through which the posterior end of the bar passes into the oxyphosphate by which the crown is fastened in the tooth, in which a groove has been previously cut. . . . Dr. E. S. Gaylord, of New Haven, Conn., filled the crown of the second inferior right molar for a young lady. The cavity approached so near the pulp that the lower portion was filled with tin foil, and over this Wolrab gold cylinders were burnished with Dr. Gaylord's ivory points. The last portion of the filling was made with Williams's electric foil, No. 30, also burnished on with ivory points. He also demonstrated the use of his new rubber-dam holder. . . . Dr. J. M. Edmunds, of New York City, implanted a metallic capsule in the space occupied by the first superior right bicuspid, for a young lady aged twenty-two. The patient is in good health and has a good constitution. Dr. Edmunds entered the process with a spear-shaped drill, and injected about five minims of a ten per cent. solution of hydrochlorate of cocaine. The remaining portion of the operation was then performed without any pain. The socket was formed with the Younger and Walker spiral knives and reamers, and was subsequently syringed out

with a 1-4000 solution of mercuric bichloride. The metallic capsule, which is made of thin platinum foil covered externally with lead, which is soldered with pure silver, was placed in position and carefully burnished to the walls of the socket. A continuous-gum tooth was then selected and cemented in place with oxyphosphate of zinc. The surplus of the cement was left between the teeth in order to hold the implanted tooth firmly in position. . . . Dr. F. Milton Smith, of New York City, filled the labial cavity of a superior left central incisor for a young lady. The cavity extended to the margin of the gum, which was readily held out of the way by means of Dr. Smith's improved clamp exhibited at our last meeting. As Dr. Smith has presented this clamp to the profession without any hope of royalty, it is hoped it will soon be placed on the market. Rowan's gold cylinders and Williams's pellets were skillfully packed by means of the pneumatic mallet. Dr. Smith also exhibited a model of a case of mal-occlusion in a boy aged fourteen, and asked for advice concerning the treatment of the case. . . . Dr. Edward D. Frost, of Elizabeth, N. J., operated on a young man. He filled the first superior left molar with gold. It was a large compound cavity occupying most of the crown and palatine fissure. He also filled the crown of the first superior left bicuspid. He used the new Bonwill mallet and Rowan's gold foil, Nos. 4, 30, and 120. He used the mallet with a simple connection of his own devising, being merely about an inch of spiral spring covered by tubing, making the mallet when used much lighter than by the ordinary connection. . . . Dr. W. S. Elliot, of Hartford, Conn., presented a new rubber flask, which is held in position by a spring hook obviating all bolts and wedges. He also exhibited his separator and matrix-retainer. . . . Dr. Charles T. Howard, of Rochester, N. Y., furnished samples of his new dental finishing cloth strips. They were found to be very useful on account of their thinness and yet great toughness. They are furnished in various grades from coarse to fine, and in three different widths.

Dr. E. Parmly Brown. Mr. Chairman, the chairman of the Clinic Committee spoke to-day about the results of clinics that I have given before this society in all-porcelain bridge-work during the last four years, and I told him I would spend a minute or two this evening in explaining the condition of the bridges which you have seen at the clinics.

The young lady whom I exhibited there, and for whom I put in, three years ago, a bridge of four upper incisors, which was described and illustrated in the DENTAL COSMOS, I have not seen since she was at the clinic, but two weeks ago I operated for her brother and he in-



formed me that his sister's work was in perfect order. Two years ago, at the great meeting where our clinics were held at the New York College of Dentistry, I operated for Dr. Crenshaw, and in writing to me a few days ago he remarked, "I have had the book on crown- and bridge-work for some time, and have gone through it; yours is all I care anything for. The gold business is filthy, but I know from experience that yours is not. My tooth is clean and nice, and people do not believe it is artificial when I show it to them."

Those are two important cases, as you will remember, and I thought I would report upon them.

President Walker. We have with us this evening Dr. Sudduth, of Philadelphia, who will give us an illustrated lecture on the subject of photo-micrography. Gentlemen, I have the pleasure of introducing Dr. W. Xavier Sudduth.

#### PHOTO-MICROGRAPHY.

Dr. Sudduth. Mr. President, I have no paper to present to you this evening. As most of you know, I prefer to talk off-hand. I have here to show you some work of recent origin, some advanced work in photo-micrography. For about seven years I have been photographing tissues and using the photographs thus made for illustration. All the illustrations of the article on histology in the "American System of Dentistry," which I wrote in 1885, were made by a photographic process, from actual photographs of the tissues, and the photographs transferred directly to the stone, so that all possibility of error in drawing was obviated. In all the work that I have done that has been the main point that I have tried to obviate. The personal equation or bias of the observer has always to be taken into consideration in wood-cuts, and that is one reason why I hail with great pleasure the advance that has been made in photo-micrography in the last few years. Most of the advanced work in this direction has been done in America. America leads the world to-day even in photography, and in photo-micrography is also well in advance of all other countries.

I have to show you this evening some work that has never yet been produced on the screen, so far as my knowledge goes, or brought forward in the illustration of the tissues of the body.

The great trouble in using the actual tissues for demonstrating histological conditions has been in getting a sufficiently high power and a sufficiently strong light to show the cellular structure on the screen. To my knowledge there are only two lanterns in the world that will do that. One is called Stricker's lantern, although Dr. Stricker is not its inventor. I had the pleasure of studying under Dr. Stricker with the lantern while in Vienna. He could take the

actual tissue and throw a picture on the screen with sufficient amplification to illustrate the subject to five hundred students. But that lantern complete costs three thousand dollars, and it requires a trained electrician to run it. A lantern of that kind has never been tried successfully in this country. Drs. Heitzmann & Co. brought one here several years ago, but have never put it into use, never having been able to get sufficient electric power. A friend of mine at the Illinois Normal University, through the munificence of the Illinois legislature, invented a lantern with which he could show the actual tissue on the screen. I had the pleasure of using that lantern several times, as early as 1882. But it was necessary to have its inventor, Prof. Seymour, always along to run the lantern. So we have been driven, in general work, to the use of photo-micrographs. The objection that has been raised to them is that all that could be produced was lights and shades, that you could not reproduce the color of the tissues, and that part of the effect was lost. Within the last four years I have been experimenting more or less in the direction of reproducing on the screen the colors of the original microscopic slide. As you all know, we stain the tissues with two or three different colors in such a way as to get a contrast. Heretofore the only way we could reproduce that contrast was by lights and shades in the photo-micrographs. To-night I have the pleasure of showing you a number of slides where I have obtained almost an exact reproduction of the original colors of the slides that were photographed. It is not done by hand-painting; it is done in the toning process, with chemicals. I will show you some of these photo-micrographs stained with carmine, others with gentian violet, hæmatoxylin, and eosin, and also with Bismarck brown; by means of which you can get the contrast of colors, and reproduce on the screen almost the same shades and tints of the original tissues. I have also two hand-painted pictures, to show the difference between the two. There is always a possibility, when you have used the pencil in retouching photographs, that some one will say you have made the pictures, and that they do not correctly represent the tissues; but when a photo-micrograph of a tissue is made in the ordinary way and then the natural colors are reproduced by staining without retouching with the brush, no one can say it has been tampered with. If you are acquainted with the tissues at all you will be able to recognize them when thrown on the screen.

I have no regular lecture to give you. I came to show you the possibilities of photo-micrography in the demonstration of tissues, and will simply make a few remarks as the pictures are shown. It is true that I have picked out of several hundred negatives the best that I have, but the majority of my work is not so very far below what you will see on the screen.

[Over fifty specimen slides were then shown and explained by Dr. Sudduth.]

President Walker. Gentlemen, the remarks of Dr. Sudduth, and the pictures he has shown, are open now for discussion. Dr. Allan, we would like very much to hear from you.

Dr. G. S. Allan. I have very little to say, Mr. President. I have been intensely pleased with these illustrations on the screen. Undoubtedly they are a step in advance of anything that we have had heretofore. They show the tissues in a way that all those who have used the microscope—and only those who have used the microscope—can thoroughly appreciate. I cannot say that I see any special advantage in this chemical process of staining. It is an after-effect; it is not a reproduction from the specimen itself, but is simply a chemical tint given to the photographs. The value of staining lies in the differentiation of the different elements of the tissues, and in that only. When the staining simply casts a uniform tint all over the picture, although the effect is very beautiful, I do not see that it is especially valuable.

Dr. Sudduth. It intensifies the dark stain in the nuclei also.

Dr. Allan. In that photograph of the ovary of the cat, which I claim was not done by my friend Smith, who is here, I know that the stain is entirely different from that which the doctor reproduced here, as I have the original; the marked differences between the original and the picture which we have seen on the screen are very manifest; but, taken as a whole, I think the exhibition to-night has been a very satisfactory one, and the future of this line of work is very promising.

Dr. Sudduth. One word in regard to the specimen taken from the ovum of the cat. I never saw the original of that at all, so I did not know with what colors it was stained. If Dr. Allan will give me the original I am sure I can reproduce the tints in it. If I had known what the original stain was I could have reproduced that stain. There is no question but that I can reproduce the tints of the original slide in most cases, and can intensify the colors in all cases. For my own work I would rather have the unstained specimens, but for a popular lecture I think the colors are desirable, and that is the point I claim for it.

Dr. Allan. I have two slides of the ovum of the cat; they were both prepared by Dr. Beckwith, formerly of New York, now of New Haven, Conn. One was stained with carmine and the other with hæmatoxylin. The one that Dr. Andrews photographed was stained with carmine; and in the original you can see the elements of the ovum as clearly as they are shown in any work that we have on



histology. The staining is not a uniform tint cast all over the picture, as Dr. Sudduth had it, but the nuclei are sharply stained and the rest of the tissues are not stained.

Dr. Ottolengui. Mr. President, I would like to ask Dr. Sudduth a question. He showed one slide on the canvas that interested me very much: that was a specimen of enamel. He called attention to the dark lines running through it, and said that they are not organic. I have seen a specimen under the microscope, shown by Dr. Heitzmann, in which he claims there is apparent the so-called enamel-fiber, and so does Dr. Bödecker. Any one who has looked through a microscope of one thousand diameters at the specimens of this tissue will be reminded very much of its appearance by this picture; but it seems to me to-night that these dark lines are what Dr. Sudduth claims them to be,—simply shadows. I wanted to ask if that is what he means, that they are shadow lines thrown by the enamel-prisms, and not enamel-fibers.

Dr. Sudduth. That is my position: those lines which are referred to by others as being organic basis-substance are shadow lines. If these lines [pointing to screen] were found all the way through they would show from one end of the specimen to the other. Of course there is a radical difference between Dr. Heitzmann and myself in regard to the interpretation of the phenomena here seen on the screen; but each of you has the right to draw your own deductions from what you see on the screen, as well as Dr. Heitzmann or myself. That is the advantage of lantern work over work with the microscope. It brings the subject before an audience, and does not limit the observation to the single individual.

Dr. Dwinelle. Mr. President, I think the illustrations that we have been favored with this evening cannot be too highly commended. I wish to emphasize one point which I have thought a great deal about heretofore. We have been very apt to accept the drawings of microscopists as the ultimate in the matter. I think these illustrations show the folly of assuming that the perfection of photography is inferior to the human eye and the human hand in drawing, that the pencilings of what appears to the observer are more correct than the drawings of nature herself. But the illuminated sun-pictures that we have had to-night in white and black are absolute. It seems to me that this field of observation which has been so clearly opened to us this evening is the right one, it carries with it the stamp of authority, it is the ultimate. Some of the photographs thrown on the screen are almost startling in their presentation; they have all the clearness and sharpness of definition of the best steel-engravings. With reference to the colors, I am inclined to agree with what has been expressed, that the coloring is

more a matter of fancy than of utility or real satisfaction. I am sure the illustrations which Dr. Sudduth has given us in black and white are much better defined than the colored ones. It seems as though the coloring had the effect of reducing the sharpness of the outlines. I do not condemn the system, however, for I believe there are great possibilities in it which may yet remove all its objections. I think we are under great obligations to Dr. Sudduth. For one I am very grateful to him. I also feel that I have allowed myself to fall far in the background in this department of microscopy; it will stimulate me to take up the old burden and carry it on anew.

Dr. Roy. Mr. President, I think what has been said to-night in regard to staining these specimens must be rather discouraging to Dr. Sudduth. Although the unstained specimens appear to trained eyes—and all dentists have trained eyes—more distinctly defined than the others, still I think the staining emphasizes certain points shown in the unstained slides, and helps some of us who are not microscopists to understand the specimens better.

On motion of Dr. Northrop, a vote of thanks was tendered to Dr. Sudduth for his very able lecture.

Adjourned.

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At the annual meeting of the society, held April 9, 1889, the following were elected officers for the ensuing year:

*President*—A. L. Northrop.

*Vice-President*—J. F. P. Hodson.

*Secretary*—B. C. Nash.

*Treasurer*—John I. Hart.

*Librarian*—J. Bond Littig.

Delegates to the State Dental Society (for four years): Delos Palmer and Eugene Palmer.

B. C. NASH, D.D.S., *Secretary*.

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## CHICAGO DENTAL SOCIETY ANNIVERSARY.

### SECOND DAY—*Evening Session*.

(Concluded from page 293.)

THE meeting was called to order by President Swasey at 7.30.

Dr. R. R. Andrews read a paper on

THE DEVELOPMENT OF THE TEETH, THE FORMATION OF DENTINE, AND  
ITS APPEARANCE IN HEALTH AND DECAY,

With lantern illustrations of photo-micrographs.

Dr. Andrews said that he wished to call attention to the band of calcified tissue lying between the fully calcified dentine and the ad-

jacent tissue from which it was formed, and which was called calco-globulin. This can best be seen by the use of the microscope upon sections from tissue which had been decalcified by the action of weak acid. Cross-sections from growing teeth, taken at a period when calcification is commencing, show it to the best advantage, or still better a section on the edge of a calcifying dentine-germ at any stage before the tooth is wholly formed. The peculiar globular formations show best in tissue which has been in the decalcifying acid for two or three days only.

If carbonate of lime be slowly added to a thick solution of albumen, the resultant salt is in the form of globules laminated in structure like tiny onions, and the particles in contact become agglomerated into a single laminated mass, appearing as if the laminae in immediate apposition blended with one another. The globular masses lose their individuality and become smoothed down into a single mass, and suggest that the smaller masses have formed themselves into concentric layers, which have coalesced, and in the substitution of the globular for the crystalline form the salt of lime when in contact with albumen. This is claimed to be the clue for the explanation of the development of bone, teeth, and shells. It is the first stage in the process of the calcification of a tissue.

Dr. Andrews had found many sections showing the formation of these peculiar globular masses on the edge of forming dentine or enamel. At a very early age the layer of calco-globulin is about as wide as the layer of dentine formed, and is also about as wide as the layer of formative cells—the odontoblasts. At a later stage the dentine is thicker and the layer of calco-globulin much narrower. These facts were very beautifully shown in the views.

It is difficult to arrive at exact conclusions in regard to this globular formation of the dentine. Dr. Andrews believes it to be the first form that exists previous to a calcified layer. That is, that small globules coalescing form large ones, and these coalescing form the layer of calco-globulin which by complete calcification forms dentine-matrix or basis-substance. While there are small, glistening bodies, calco-spherites in the pulp-tissue near the odontoblasts, it is probable that those forming the larger globular masses have for their source the odontoblasts. In some of the sections it appears as if the odontoblasts were being enveloped in the larger globular masses which form the layer of calco-globulin, but this was not certain.

In the study of dental caries there was very little left to do, as the experiments of Dr. Miller had been so thorough. Dr. Miller's early experiments led him to believe that the first stages of decay were caused by acids, for the most part generated in the mouth by fer-



ments, and he went to work to determine the nature of these ferments and the conditions favorable or essential to their action. Some of us know how well he succeeded. Yet it seems there are many who do not appreciate the importance of his work. His specimens of natural and artificial decay show beautifully the results of his carefully conducted experiments. It is actually impossible for anyone, even under a high power of the microscope, to distinguish the artificial caries from the natural. We must all acknowledge the service Dr. Miller has given to the advance of real and exact knowledge of the subject.

Dr. Andrews's paper was followed by an exhibition of photomicrographs projected upon a large screen by the lantern, showing the appearance of sections cut from teeth in health; also natural caries, and caries produced in teeth out of the mouth by Dr. Miller.

#### *Discussion.*

Dr. Black said that such a showing of this subject had not been dreamed of until recently. It was even more satisfactory than if they had each one had the privilege of looking through the microscope at the prepared sections,—more satisfactory because we have all seen, while the untrained eye is not able to see properly through the microscope. These views will be a wonderful aid in helping us to understand the subject of micro-organisms and forming tissues. Here we see the micro-organisms at their destructive work. We here see the slides prepared by Dr. Miller and Dr. Andrews. There is no possible deception about them, and we can judge of how sound are the foundations and how clear is the proof of their theories of caries.

In reference to calco-globulin, he said that there were often things in microscopy which were deceptive, and he thought this formation was not understood. It is found whenever there is a space of decalcification or calcification of tooth-substance; also in bone-formation. A similar appearance is found when a tooth is decalcified out of the mouth,—these particles fall down in onion-like layers. It may be that in life the vital forces have not had quite sufficient grasp, and the substance falls into these forms. He did not think that the bands seen between the calcified and decalcified territory were always of calco-globulin, but thought that in some cases they were due to post-mortem changes of the tissue, not understood. It is extremely difficult to tell the true from the false, but these layers are not always found where we would expect them. The subject of the formation of the dentine, the bone, and enamel is involved in such difficulty that we cannot yet understand it. In making

sections for microscopic study of this subject, he had found that by the use of certain agents in preparing the sections he would get these border lanes, with other agents he would not, so he was certain that sometimes they are due to post-mortem changes.

Dr. W. X. Sudduth said that he had given several years to this method of showing the results of the study of microscopists to audiences, so that everyone could see for himself, and to remove the errors which in drawings will always exist, due to personal equations. This showing which Dr. Andrews has afforded us this evening is the best work of the kind which has yet been done. The many have had an ocular demonstration of the work which has been done by, and must always be done by, the few. You now have a right to form your own opinions. One point in regard to calco-globulin. Negative evidence is sometimes the best evidence, and as this appearance is not always found,—the specimens shown in the early part of the evening show that calcification goes on without this appearance,—it must be either pathological or accidental.

The pipe-stem formation pointed out in one or two of the views looks like bacilli in the tubules, only they are too broad for their length. This resemblance is not apparent when looking at the specimens through the microscope, because the pipe-stem formation does not stain as the bacilli, and so we see it must be something else. In his opinion they are spaces filled with air.

Dr. Andrews, in closing the discussion, said he found sometimes in the teeth of animals the layer of calco-globulin between the fully calcified and the other tissue.

Dr. L. W. Comstock read a paper entitled

#### ARTISTIC METHODS IN PROSTHETIC DENTISTRY.

He dwelt at length upon the importance of the study of the human face, the muscles of expression, and the relation existing between the several features, in order that the dentist may be enabled, in restoring the dental apparatus, to restore also the harmony of the facial requirements.

Artistic methods, he explained, involved a careful observation of the head and face, and the embodiment of this observation in a sketch with notes. After careful study of this sketch, if it do not seem sufficient he makes a second,—a profile sketch, engaging his patient in conversation and noting the action of the muscles, and recording any peculiarity observed, such as an unusual exposure of the teeth and the gums. The ordinary classification of round, oval, square, or flat face is not sufficiently explicit. There are innumerable modifications and variations demanding thorough study of the

individual face. By such methods it is not only possible to avoid any disfigurement as the result of the loss of teeth, but actually to improve upon the original. For instance, if there is a want of proper proportion in the length of the face from nose to chin, it can be corrected by making the substitutes longer or shorter than the natural teeth were. A failure to establish proper proportions results from ignorance of recognized laws. The harmony of lines in faces must also be considered, for in some types they are horizontal, in others perpendicular, and again in others more or less oblique. Frequently the two sides of the face are not symmetrical; the tip of the nose and the point of the chin are not always in line with the center of the mouth; one side of the upper lip may be thinner and shorter than the other; the corners of the mouth droop, or are elevated, in different cases, and the line of occlusion of the teeth should be made to conform to the lip-line of contact.

With the lips slightly parted, the relative positions of the alveolar ridges to their parting line should be noted to aid in the selection of long or short over-bite teeth, and in the placing of them so as to bring about their proper exposure when the mouth is opened. The maxillary ridges are frequently higher on one side than on the other. If this condition is found on the superior ridge, the inferior ridge will have a reverse form. If a denture be built upon these irregularities without taking into consideration the lip-line of parting, it will have a crooked appearance when in place. The size and shape of the face, relatively to the size of the mouth and maxilla, should be noted in order to an intelligent determination as to the size of the arch of the denture. To make these and similar observations to the best advantage, the patient should be placed so as to enable the dentist to note facial defects to be remedied, such as depressions not common to both sides. The benefits to be derived from a study of the profile can be readily appreciated. The anterior surface of the upper teeth should be made to conform to that part of the profile to which the upper lip belongs, and we should be careful to have a memorandum made of the relation of the lower jaw to the facial line, because if the line of occlusion is at an angle of forty degrees to the facial line, the denture will resemble squirrel teeth, the elevation of the posterior portion of the plate causing the front teeth to incline inwards.

There can be no really esthetic prosthesis without this careful study with trained powers of observation.

#### *Discussion.*

Dr. W. H. Dorrance said that the paper demonstrated that it was necessary that the dentist who aspired to produce the best results



should be an artist. The paper suggested new ideas to him, and methods which will be helpful to many of us. Prosthetic dentistry has not been held in the esteem to which its importance entitles it. We should be prepared to insert artistic artificial dentures, preserving and restoring facial harmony. There are some who, by careful study and careful work, replace lost organs so skilfully that their artificial character is not easily recognized.

Dr. W. W. Allport said this paper shows the necessity of what he and others had long contended for: that prosthetic dentistry should be practiced as a painter or a sculptor pursues his art. It should be a specialty, and honored as such. Two or three dentists in each of the larger cities should devote themselves to this specialty, and those in need of artificial teeth should be referred to them. If this plan were adopted, the community would be much better served than it can be until it is made worth the while of capable men to specially fit themselves for this really artistic work by the artistic training required.

Dr. L. P. Haskell said that artistic work could never be done with gum-section teeth.

Dr. Comstock, in closing the debate, said that he had not advocated the use of gum-section teeth; he did not approve of them. Artistic adaptation should be taught in every dental college. Every art principle which can be adapted to the subject should be studied and taught. The basis of artistic adaptation is the necessity of having the teeth conform to the face.

A paper by Dr. F. McGraw, entitled

#### OBTUNDING OF SENSITIVE DENTINE AND CONTROLLING PERIDENTAL INFLAMMATION BY ELECTROLYSIS,

was read by the secretary. The salient points were as follows:

The system of obtunding sensitive dentine to which your attention is called has these points in its favor: It is safe, it does all that is claimed for it, and it is not patented.

To a twelve per cent. solution of cocaine add an equal amount of absolute alcohol. In connection with this, use the galvanic current, varying the power as the needs of each case may indicate. The method of application is as follows: After applying the rubber-dam, wet a pledget of cotton in the solution; place it in the cavity of the tooth; press the point of the positive pole on to the cotton, and the negative pole, with sponge attachment thoroughly wet, to the cheek, turning on the current. Rarely will more than four cells be necessary if the battery is in good order.

An application of three minutes, with an interval of like dura-

tion, and then another three-minute application, is sufficient in the majority of cases, though occasionally it is necessary to make the third application; then dry the cavity thoroughly and begin excavating.

His deductions as to the physiological effects are that the galvanic current acts as a vehicle for conveying the medicinal agents. The cocaine current anesthetizes the odontoblastic cells and the pulp. The styptic properties of the alcohol act upon the dentinal fibrillæ, which are of an albuminous nature, causing contraction and increased density and firmness. His reasons for these conclusions are as follows: He had found that even in the most sensitive teeth the pain was obtunded; that after a certain time had elapsed the sensitiveness would return, but never to the degree which existed before the application of the obtundent. His conclusion from this was that a change had taken place in the dentinal fibers which he thought was due to the styptic qualities of the alcohol, and not to the electrolytic action of the galvanic current.

A devitalized tooth is not a conductor of the electric current.

In the case of peridental inflammation he directed that a stronger current should be used, which he claimed would tetanize the vessels and cause a diminished flow of blood to the parts and thus lessen congestion. The same current longer continued will cause electrolytic decomposition.

The medicinal agents which he uses for peridental inflammation and for blind abscesses are a saturated solution of the chloride of sodium seven ounces, tincture of ergot one ounce. The chloride of sodium is a constituent of the blood, keeping the fibrine and albumen in solution. In an inflamed condition the tissues lack this ingredient, which we supply artificially. The tincture of ergot stimulates contraction of the blood-vessels and causes anemia. Taken together, the combination decreases the flow of blood, reduces congestion, and furnishes an element which is lacking and upon the presence of which normal conditions depend. The treatment of blind abscess requires stronger battery power in order to obtain the full effect of electrolysis.

This method has been extremely successful in the painless removal of pulps in the hands of Dr. Weeks as well as in my own, and you will find in it an agent which will give satisfactory results when followed.

Adjourned.

## UNION CONVENTION OF THE FIFTH, SIXTH, SEVENTH, AND EIGHTH DISTRICT DENTAL SOCIETIES OF THE STATE OF NEW YORK.

(Concluded from page 305.)

THIRD DAY—*Afternoon Session.*

THE convention was called to order by President Mason.

Dr. S. E. McDougall, Clinton, presented a patient with cleft palate, whom he had supplied with apparatus to overcome nature's deficiencies. He did not propose to take up the time of the meeting with a lengthy description, but would let the work speak for itself. The cleft merely extended to the posterior border of the hard palate, not into it. He first took an impression and made a model as for an artificial denture. From this he made a trial plate or pattern without teeth, and ran wires from the plate to the cleft. He then built back with gutta-percha, filling the cleft to the pharyngeal muscles, when it "gagged" the patient and he took it out, and trimmed it so that the gutta-percha reached to within about a quarter of an inch of the back wall of the throat. The appliance seemed to work all right, and he then made another similar appliance with the teeth in place on the plate. The obturator part is a hollow bulb, which is made by inclosing carbonate of ammonia in the rubber in a mold of the proper size, when the application of heat causes it to puff out and fill the space.

[The patient's power of speech with and without the appliance was tested before the meeting by a number of those present, and the work was pronounced satisfactory.]

Dr. F. W. Low presented reports of two cases of implantation, the first of which was in the mouth of Dr. B., aged thirty-eight years; nervo sanguine temperament; health excellent. The implanted tooth was the superior left first bicuspid; the operation, which was done on the 26th of August, occupying about one hour. Cocaine was exhibited locally, and very slight pain was experienced. Bichloride of mercury, 1-1000, was used as an antiseptic, followed by chloroform to control the hemorrhage. There was no tenderness of the surrounding tissues, but considerable swelling was manifested, which had pretty well subsided by the third day. The patient was not seen again until the end of the fourth week, when he reported for treatment. Considerable absorption had then taken place at the palatal border of the incision, and the tooth was too loose to be longer tolerated, though the patient has since expressed regret that he gave up the trial so soon. The tooth was removed October 15. Dr. M. J. Downer, Buffalo, N. Y., was the operator.

The second case was entirely experimental. The idea had sug-



gested itself to him that if a tooth from another mouth could be implanted successfully it might be possible to retain an artificial tooth. To test the matter a tooth was constructed with porcelain crown and an open platinum root (see Fig. 1, which sufficiently explains the details), and the relator offered himself for the experiment. The implanted tooth substituted the first superior right molar, which had been extracted some fifteen years previously.

The operation was performed Friday, September 21, by Dr. Theo. G. Lewis, of Buffalo, N. Y., without the exhibition of anesthetic agents of any character, and very little pain was experienced. The duration of the operation was one hour. The artificial socket was constructed with the Younger trephine and burs, and the artificial tooth was inserted and ligatured, the open space in the root being filled with sponge-graft. The first day there was no tenderness of the gum or jaw, and no swelling. On the 23d the tooth was loose, and shooting, darting pains were felt in the jaw. On the 25th the jaw was quite sore and painful, and a sensation of dull pain extended over the entire right side of the face and to the right temple, but all this ceased the next day, when there was but slight tenderness of the tissues surrounding the wound, and their appearance was perfectly healthy. From this time to October 16 no material change was noted, there being no discharge or soreness about the wound at any time; but on that day the sponge-graft was found to be slightly protruding from the wound on the palatal aspect of the tooth, and on careful examination it was found not to be attached to the tissue by granulation at any point. Fearing it might become an irritant, it was removed, and an absorbent cotton tent substituted to close the orifice of the wound and prevent the lodgment of particles of food in proximity to the platinum root. The cotton tent has been renewed every alternate day, each succeeding one being made smaller as the orifice closed. From the first the wound has been syringed daily with phénol sodique solution. The final result is still doubtful. He bases his hopes of success on the reasoning presented by Dr. Edward C. Kirk in a paper read before the Pennsylvania State Dental Society in June last: "Immediately following the incision an exudation of leucocytes or so-called plasma-cells takes place. These become organized and develop into connective tissue with its capillary blood-vessel system, following which in bone-construction a deposit of calcific material takes place, and ossification ensues through the agency of the osteoblastic cells, which belong to the connective-tissue group. Where from any cause the irritation is sufficiently great to set up and maintain for a time a high degree of inflammation, giant-cells or osteo-

FIG. 1.



clasts are developed, and absorption takes place through their agency until the cause of the irritation is completely removed. It is possible for the inflammatory process to abate and a normal condition of the tissues to result, whereby the reparative process first alluded to will follow, even after a considerable degree of absorption has occurred."

In another case he should construct the platinum root as shown in Fig. 2, as this form would better retain a bone-graft (which he would substitute for sponge-graft) and afford a greater chance for the establishment of connective tissue; the attachment of the crown not being done until subsequently, for the reason that the root without crown can be retained in its socket without moving about, whereas even the slightest disturbance, which must occur if the crown be attached from the first, jeopardizes greatly the success of the operation.



The discussion of Dr. Howard's paper was resumed.

Dr. C. S. Butler, Buffalo, wished to say a word of appreciation of the work which Dr. Howard has done. All of us have experienced the difficulty which he has pointed out. He was gratified at the results so far attained, and hoped Dr. Howard would continue his investigations.

The subject was passed, and Dr. Darby's paper on "Mouth-Breathing" was taken up.

Dr. Dwinelle thought it one of the most interesting papers that had been brought before the meeting. The natural process is to breathe through the nose. Dr. Darby has referred to the work of Catlin. Catlin goes on to state that the Indians were free from malarial diseases, and he attributes their immunity to their keeping their mouths shut and breathing through the nose. The sanitary influence of breathing through the nose is not so generally accepted as it ought to be. The nasal passage is supplied with fine hairs which act as a sifter or filter for the air breathed, and so modify it as to qualify the irritation which it would otherwise cause the lungs. He read some years ago a series of experiments, in which rabbits were shut up for days in old smut, and on being taken out and killed and dissected not a particle of it was found in their lungs. They breathed through the nose. Old surgeons say that a physician should go into the sick-room with a full stomach and keep his mouth shut while there, as a preventive of infection.

Dr. Barrett believes that mouth-breathing has an influence in the production of dental decay. We should teach the proper method of breathing wherever we see a tendency to improper respiration.

Dr. Boynton was reminded, while Dr. Dwinelle was speaking, of

the fact that if a small pair of tweezers be passed up the nose and some of the fine hairs in the nasal passage be pulled out, they will be found on examination to be loaded to the very end with germs. The whole of dentistry refers to that tissue which covers the entire body. Of all the modifications of dermal structure the teeth are the most perfect. The office of the hairs in the nasal passage—which are another modification of dermal tissue—is to strain the atmosphere of the spores which produce disease, and they are thus disinfectants, in their way, as corrosive sublimate is in its way. He uses corrosive sublimate in solution to wash out the nasal passages when he is exposed to malaria.

The subject was passed, and the cleft-palate operation by Dr. McDougall was taken up.

Dr. Barrett would say about the surgical operation for cleft palate that if done early enough in life, it might obviate the necessity for an obturator, but there is something in the juxtaposition of the parts involved in speech that it seems utterly impossible to secure unless the operation is performed in early infancy. The principal factor in the production of sound is the velum palati, which must come in contact with the posterior wall of the pharynx for the correct articulation of sounds. If operative procedure is undertaken too late, it is apt to do no good whatever. The case presented by Dr. McDougall is a remarkable success.

Dr. Dwinelle. In former years Hullihen's operation was performed in these cases, but it is now accepted that where operative interference is not employed in early life it is useless.

The subject was passed.

Dr. Barrett moved a vote of thanks to those who projected and carried out the plan of this meeting, and more especially to Drs. Geo. L. Curtis and S. B. Palmer for their untiring efforts to promote its success. So ordered unanimously.

Dr. F. D. Nellis, Syracuse, read the report of the clinic committee, which was received and adopted.

The joint convention then adjourned.

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#### PHILADELPHIA COUNTY DENTAL SOCIETY.

A REGULAR meeting of the Philadelphia County Dental Society was held in Earley's Hall, Thirteenth and Arch streets, March 27, 1889. President F. L. Bassett in the chair.

Dr. L. A. Faught read a paper on

#### ARSENIOUS ACID.

This poisonous agent, arsenious acid,—not arsenic, as it is commonly called,—is used almost universally for devitalizing teeth. It



is therefore our duty to know how it can be used safely, how to recognize injurious effects, and how to treat results of its misuse. No drug in the range of dental *materia medica* demands more careful study than arsenious acid.

The preparation of this drug first recommended for devitalizing teeth is superior to any that have been since offered. No other formulæ have any good qualities not possessed by the original, and they usually lack some of its advantages.

The amount of the drug which may safely be introduced into the stomach should of course never be exceeded in an application. One-twentieth of a grain is a safe dose medicinally, but much less than that is sufficient for devitalizing teeth. Extreme care should be used to see that it is not introduced into the mouth unintentionally by napkins, instruments, or rubber-dam. The essayist had seen instances where such carelessness had been the cause of serious trouble in cases where the drug had not been intentionally employed, but had been used in other cases and left upon the instruments or upon the slab on which they rested. In his own practice a number of patients had complained of sore mouths, and showed what he recognized as arsenical ulcers. His suspicions were directed to the rubber-dam as the cause of the trouble. By a carefully-watched experiment on a healthy mouth he found that such ulcers followed the application of the dam, and he discarded the dam he had on hand and procured a new supply. His conclusion was that no make of rubber-dam could be considered always free from arsenious acid, which is probably sometimes introduced with the sulphur or the soapstone on the dam.

Another source of trouble may be the contact of arsenious acid with the soft tissues during the removal of old fillings from teeth which had been devitalized with the drug. It may also occur from a tooth which has been drilled and where subsequently arsenious acid has been applied, which passes through the perforation. It may also escape from the tooth because the orifice has been imperfectly sealed.

When from any cause arsenious acid comes in contact with the soft tissues of the mouth, the ill effects become apparent in about twenty-four hours, the condition when seen by the dentist depending upon the time which has elapsed since the agent had been acting. At first there is only a slight soreness with some congestion; next small ulcers appear, which increase in depth, but only slightly in area. The irritant seems to drop to the bottom of the sore and keep up its action on the sound tissue beneath. The patients do not complain of much pain, only slight discomfort; and the ulcers are not painful when touched; but if the arsenious acid gains access to the periosteum the pain becomes intense.

The treatment suggested by Dr. Faught is as follows: Wherever practical, the soft tissues should be curetted. Scarify freely, and then touch the wound with muriated tincture of iron. Then cauterize the wound with carbolic acid or iodine, and if need be stimulate further in a few days with another application of the same.

### *Discussion.*

Dr. A. B. Harrower said he had experimented with cosmoline as a vehicle for the arsenious acid, but it was not satisfactory. He afterward used sulphate of atropia mixed with lanolin to devitalize pulps, but after successfully using it for about eighteen months he had trouble with several teeth and gave it up. He had never had such experiences as the essayist had described.

Dr. S. J. Dickey said his experience was very limited. When it was possible he always endeavored to save the pulp by capping, and had a large proportion of successes.

Dr. Alonzo Boice said that his experience taught him that the smaller the amount of arsenious acid used the better the result would be. His method was to use an exceedingly fine probe,—so fine that it could be stuck into one's hand without causing pain. He prepares the arsenious acid by grinding it as fine as possible, and, taking a little on this probe, he inserts it into the pulp. The quantity used would not exceed perhaps one-five-hundredth of a grain, and if it was not sealed in at all it would do no harm. The trouble described by the essayist comes from the abuse of the drug, not from its proper use. He usually prepares the tooth by an application of sulphate of morphia the day before applying the arsenious acid, and pain seldom results. The use of the tap to remove old fillings in such a way as to perforate the tooth is a source of trouble difficult to avoid, as we cannot always know that arsenious acid had been used in the tooth. Such cases come before us sometimes.

Dr. C. B. Dixon said that though he believed he used arsenic to devitalize teeth more than any other dentist in the city, yet he had never but once had any trouble with it. This was the case of a lady into whose front tooth he had inserted the acid and sealed it with cotton and sandarac. He told her to come to him the next morning, as he did not want it to remain in more than twenty-four hours. As it was not convenient for her to keep the appointment, she had removed the cotton, and when he saw her, her lip was sore and swollen. He had made a previous application and did not get the results desired, and this was a second application. When he saw the condition he was frightened, but it readily yielded to treatment with tincture of iodine, and was well in about four days. He was surprised to hear of the number of cases the essayist had reported.

He had never had any trouble with rubber-dam. He always washed it before using it.

Dr. C. E. Hopkins said his method was similar to that described by Dr. Boice, and he never had any trouble. He did not use cotton to seal the arsenious acid in.

Dr. Otto Inglis said he had had one case of trouble. He had removed a filling from a tooth which had been devitalized a couple of years before, and he had to remove a small sequestrum. It healed up nicely after the operation.

Dr. F. L. Bassett said he had had no such cases in his practice. He preferred to use gutta-percha for sealing the cavity when he inserted arsenious acid, because the softer cements and cotton were liable to come out. Sometimes patients did not keep their appointments, and long afterward would return, say the filling had come out. Therefore he preferred to seal with something he could depend on.

Dr. Faught said that the fact that most of those present had had no cases such as he had described proved the old saying that people see what they look for. Because there is no pain the condition is likely to be overlooked, and recovery is frequent without treatment. The condition usually gets worse till about the fifth day, and then slowly improves.

There are many more of these sores produced than are found, but if they were carefully looked for they would be found more frequently. He had known cases in connection with college work which were perfectly dreadful. When a student has such an experience he turns to his books for comfort, but does not find it. There is nothing in dental literature on the subject. With the treatment he had indicated the trouble will be shortened to three or four days instead of as many weeks. He asked if any of those present had had trouble following the removal of old fillings from teeth or from perforations of tooth-roots, or from rubber-dam, similar to the experiences he had recited.

Dr. W. X. Sudduth asked whether he had ever tested the rubber-dam for arsenious acid.

Dr. Faught said he never had; that when he found its use caused ulcers he discarded it.

Dr. Sudduth asked as to the location of the ulcers.

Dr. Faught said that they did not always occur in the part of the mouth to which the rubber-dam was applied. The saliva apparently carries the acid, and where it finds a resting-place it causes the ulcers. Sometimes when the dam had been applied to the lower jaw the ulcers were found on the upper part of the mouth. He described the sores as resembling at first pin-pricks located in lines or in groups.

Dr. Harrower said that his plan was to confine the arsenious acid



by an amalgam filling. He uses Flagg's facing amalgam, which is perfectly safe. His formula is one grain of atropia and two grains of arsenious acid in lanolin, applied only in extremely minute quantity, and he never has complaint of pain.

Dr. Boice said he had never found anything in rubber-dam but sulphur; this will make sores under some circumstances. He had never had any trouble with arsenic in teeth which were perforated, because he always saw every part of the cavity before he treated it; and beside, with the minute quantity he uses no harm could come. Dry cotton will answer every purpose of a seal. To put in a filling was only to make trouble in taking it out.

Dr. Sudduth asked Dr. Faught to tell the differences between the ulcers he had described and rodent ulcers.

Dr. Faught said the first difference was in location. The rodent ulcers would be found upon cheek and lip, not often on the gums over the teeth, though sometimes they were. He had never seen an arsenical ulcer on the lip. Then the difference of appearance is marked. The rodent ulcer is very often quite large, is nearly regular in shape, is indurated around the edges, and is very painful when touched. The arsenical ulcer, on the contrary, is small, has no induration, is irregular in shape like a scratch, and there is none of that white appearance which rodent ulcers have. It resembles simply raw flesh.

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## PENNSYLVANIA ASSOCIATION OF DENTAL SURGEONS.

At a recent meeting of the Pennsylvania Association of Dental Surgeons, the following items of interest were offered and discussed under the heading of

### INCIDENTS OF OFFICE PRACTICE.

Dr. T. F. Chupein related a number of cases where extreme pain was experienced by patients on the taking of hot or cold (more particularly hot) fluids into the mouth. In all of these cases, after the most thorough and searching examination, he could discover absolutely no decay in the teeth complained of, nor in any others whereby the pain could be accounted for by reflex action,—the only suspicion being *a very slight recession of the gum* on the palatal roots of the upper molars, such as is often observed in the teeth of persons who have passed the meridian of life, and who as a general thing have teeth of good organization. No deposit of tartar was observed on the teeth in question. The recession of the gums was not excessive,—not exceeding one-eighth of an inch on the roots alluded to; yet the patients complained of quite severe pain in the teeth when taking hot coffee or soup, or cold water, or when breathing draughts

of cold air. The pain was severe enough to induce them to seek dental service, even to have the teeth extracted in the effort to obtain relief. Tapping the teeth gave no response, and a close investigation of all the other teeth failed to reveal any cause for the pain.

Dr. W. H. Trueman said he had had cases just such as Dr. Chupein had described, and had recommended the use of phénol sodique in equal proportions with water as a mouth-wash, as also the employment of prepared chalk mixed with water to a thick paste and forced between and about the teeth giving such pain.

Dr. Howard E. Roberts said he also had used prepared chalk in the manner described for such cases.

Dr. John Ramsden presented a report of an operation for facial neuralgia. Mrs. S. C., of Cedar Grove, aged sixty-five, had suffered thirty years with this disease. The seat of pain was chiefly in the supra-maxillary nerve, but the other branches of the fifth nerve on the right side were more or less affected. During this time she had been under the care of a number of skillful physicians, but without any permanent relief. After all efforts had failed, and her life becoming a torment, she accepted the advice of her physician and had the supra-maxillary nerve removed, which was done ten weeks ago. The operation consisted in the division of the integuments down to the bone, trephining the maxillary bone externally, and dividing the nerve at the foramina rotunda. Since the operation she has been completely relieved of pain,—the first time in thirty years.

Dr. Trueman said that from conversation with Dr. Garretson, who had performed similar operations, he thought that he was opposed to the division of the nerve for fear of paralysis, but approved of *stretching the nerve*, and procured relief in this way.

Dr. Ramsden said that he had assisted at the operation of which he offered the above report, and had used his dental engine in trephining the bone, and that the nerve was twisted around the bur that was used on the hand-piece, like so much cotton floss might be twisted around a barbed broach. He also related several cases in which, having been unsuccessful in curing abscessed teeth, he had extracted the teeth, cut off the abscess at the end of the root, washed out the sockets, and re-inserted the teeth.

Dr. Trueman exhibited a device he had recently used to remove a broken instrument from the pulp-canal. The instrument in question, a nerve-drill of the Gates-Glidden pattern, had twisted off, deep down the pulp-canal of a superior lateral incisor. He had, in the effort to remove it, enlarged the canal around it, and loosened it so that it could be readily moved from side to side, but he was not, with any instrument at hand, able to seize it for removal. Taking a piece of fine brass wire, such as is used to keep open the needle of a hypo-

dermic syringe, he formed upon one end a spiral of a few turns by winding it upon an instrument about the same size as the broken one and securing the other end to any small tool with gum shellac (see cut). This spiral he placed over the broken instrument in the



pulp-canal, pushing it well down, with a broach. Upon gently withdrawing it, the coils of the spiral tightened upon the broken instrument, holding it sufficiently firm to effect its removal. He suggested that, in cases where the broken portion was more firmly impacted, it might be best to place within the spiral, before placing it over the broken instrument in the root, a minute portion of zinc phosphate cement,—not sufficient, however, to permit the cement to come in contact with the walls of the canal; and after placing it in position allow it to harden before withdrawing it. He said that the difficulty in removing a broken instrument from the pulp-canal is usually due, not so much to the firmness with which it is held, as to the difficulty of getting any instrument to take hold of it; especially is this the case with a pulp-canal reamer whose cutting portion is larger than the shaft.

THEODORE F. CRUPEIN, *Reporter.*

### THE SOUTHERN DENTAL ASSOCIATION.

IN arranging and appointing the following committees for the Southern Dental Association, which meets at Galveston, Texas, Tuesday, August 20, 1889, I have endeavored to select those best qualified and those who will take most interest in the respective departments of the association work. As far as possible, I have consulted and obtained the personal consent to serve, before making an appointment. Should any be unable to act, I, as president, respectfully request to be notified *at once*, so that another may be designated.

We have about seven thousand dentists in the territory embraced by the association, besides a large number of eminent and distinguished contributing members, from which to draw.

This is an important meeting, and should be largely attended. Ample facilities will be furnished for brilliant clinics in all the departments of dentistry and oral surgery. In selecting clinicians and essayists, our endeavor has been to get the best talent available. Mr. Selby, of The S. S. White Dental Manufacturing Company, has the promise, after the meeting of the American Association at Saratoga, of an excursion around from New York to Galveston, arriving at Galveston Monday night or Tuesday morning in time for the meeting. The meeting will be held at Beech Hotel, one of the best places for entertainment on the continent.



All members of the association, as well as members of the profession in good standing not members of the society, are cordially invited to attend. Come prepared to read a paper, make a clinic, or do something for the advancement of the association and the profession in the South.

Our organization is of a national character, and should continue to be an honor and a blessing, as it has been in the past. The profession in the "Lone Star State" is awake, and will give a hearty welcome to all that come.

The best possible reduction of rates by railroads will be had.

J. Y. CRAWFORD, *President*.

*Executive Committee*.—For one year, Drs. Dyer and Clifton; for two years, Drs. Storey and Catching; for three years, Drs. McKellops and Beach.

*Committee of Arrangements*.—Drs. G. W. Carruthers, chairman, Galveston, Texas; A. A. Dyer, Galveston, Texas; A. Sundt, Galveston, Texas; T. Robinson, Houston, Texas; W. R. Clifton, Waco, Texas.

*Committee on Education*.—Drs. E. S. Chisholm, chairman, Tuscaloosa, Ala.; J. H. Coyle, Thomasville, Ga.; A. J. Friedrichs, New Orleans, La.; Geo. Eubank, Birmingham, Ala.; W. H. Eames, St. Louis, Mo.; A. W. Harlan, Chicago, Ill.; C. G. Edwards, Louisville, Ky.; M. W. Foster, Baltimore, Md.; B. H. Catching, Atlanta, Ga.; J. H. Durham, Wilmington, N. C.; Charles L. Steel, Richmond, Va.

*Committee on Hygiene*.—Drs. G. F. S. Wright, chairman, Columbia, S. C.; Geo. H. Winkler, Augusta, Ga.; W. D. Dunlap, Selma, Ala.; G. W. Rembert, Natchez, Miss.; J. Hall Moore, Richmond, Va.; W. W. H. Thackston, Farmville, Va.; W. S. Brown, Charleston, S. C.; J. U. Lee, Chattanooga, Tenn.; Duff Post, Tampa, Fla.

*Committee on Histology and Microscopy*.—Drs. W. C. Wardlaw, chairman, Augusta, Ga.; J. L. Mewborn, Memphis, Tenn.; D. R. Stubblefield, Nashville, Tenn.; S. A. White, Savannah, Ga.; T. C. Stellwagen, Philadelphia, Pa.; B. A. Muckenfuss, Charleston, S. C.; C. C. Patrick, Charleston, S. C.; J. J. R. Patrick, Belleville, Ill.; C. Edmund Kells, Jr., New Orleans, La.; C. N. Peirce, Philadelphia, Pa.; B. H. Teague, Aiken, S. C.; C. B. Clement, Canton, Miss.; H. M. Hunter, San Antonio, Texas; J. B. Patrick, Sr., Charleston, S. C.

*Committee on Pathology and Therapeutics*.—Drs. G. S. Staples, chairman, Sherman, Texas; W. H. Richards, Knoxville, Tenn.; L. G. Noel, Nashville, Tenn.; E. E. Spinks, Meridian, Miss.; Frank Holland, Atlanta, Ga.; J. A. Thornton, Atlanta, Ga.; J. F. Thompson, Fredericksburgh, Va.; A. O. Rawls, Lexington, Ky.; G. M. Rousseau, Montgomery, Ala.; S. Newman, Dallas, Texas; F. Peabody, Louisville, Ky.; W. H. Morgan, Nashville, Tenn.; W. J. Barton, Paris, Texas.

*Committee on Chemistry*.—Drs. V. E. Turner, chairman, Raleigh, N. C.; S. G. Holland, Atlanta, Ga.; H. H. Keith, St. Louis, Mo.; R. D. Seals, Fort Smith, Ark.; A. W. Smith, Louisville, Ky.; C. L. Steel, Richmond, Va.; Morgan Adams, Sardis, Miss.; L. P. Dotterer, Charleston, S. C.; W. McL. Dancey, Jacksonville, Fla.; J. C. Wilkerson, Selma, Ala.

*Committee on Operative Dentistry*.—Drs. J. Rollo Knapp, chairman, New Orleans, La.; R. K. Luckie, Holly Springs, Miss.; W. L. Smith, Hawkinsville, Ga.; J. Taft, Cincinnati, O.; J. E. Cravens, Indianapolis, Ind.; H. E. Beach,

Clarksville, Tenn.; T. L. Westerfield, Dallas, Texas; T. M. Wyatt, Russellville, Ark.; Gordon White, Nashville, Tenn.; S. B. Barfield, Macon, Ga.; B. H. Smith, Jr., Baltimore, Md.; M. C. Marshall, Little Rock, Ark.; W. H. Keller, City of Mexico; A. A. Beville, Waco, Texas; Geo. J. Friedrichs (cylinder fillings), New Orleans, La.

*Committee on Dental Appliances.*—Drs. H. J. McKellops, chairman, St. Louis, Mo.; B. S. Byrnes, Memphis, Tenn.; L. Augspath, Little Rock, Ark.; M. A. Bland, Charlotte, N. C.; A. P. Johnstone, Anderson, S. C.; J. R. Woodley, Norfolk, Va.; T. T. Moore, Columbia, S. C.; W. W. Brooks, Memphis, Tenn.

Any member of the profession having anything new to exhibit or explain will gladly be given an opportunity to do so.

*Committee on Mechanical Dentistry.*—Drs. W. W. Westmoreland, chairman, Columbus, Miss.; R. R. Freeman, Nashville, Tenn.; (paper on "Orthodontia"); D. Genese, Baltimore, Md. (rubber work); A. W. Palmer, Chattanooga, Tenn.; M. M. Harris, Knoxville, Tenn.; W. H. Bennett, Lebanon, Tenn.; C. F. Kemp, Key West, Fla.

*Committee on Literature and Voluntary Essays.*—Drs. R. Y. Henley, Atlanta, Ga. ("Oral Surgery"); H. C. Herring, Concord, N. C. (paper on "Implantation, with results"); J. C. Storey, Dallas, Texas; L. D. Carpenter, Atlanta, Ga.; L. H. Hurley, Marshall, Texas; T. H. Lipscomb, Galveston, Texas; A. J. Lawrence, Fort Worth, Texas; J. R. Reese, Cameron, Texas; G. A. Patrick, Augusta, Ga.; C. D. Perkins, Augusta, Ga.; N. A. Teague, Augusta, Ga.

*Clinical Operators.*—Drs. A. P. Johnstone, Anderson, S. C., superintendent of clinics; Wm. Crenshaw, Atlanta, Ga., electro-magnetic mallet; J. S. Thompson, Atlanta, Ga., removable bridge-work; J. D. Lanier, Savannah, Ga., gold fillings, doing his own malleting; S. B. Cook, Chattanooga, Tenn., contour gold fillings with automatic plugger; H. A. Parr, New York City, crown- and bridge-work; S. B. Barfield, Macon, Ga., gold fillings; G. W. Rembert, Natchez, Miss., non-cohesive gold filling without the use of rubber-dam; W. N. Morrison, St. Louis, Mo., implantation; R. B. Adair, Gainesville, Ga., treatment of pyorrhea alveolaris; Dr. Conrad, St. Louis, setting Logan crown; James Johnston, Staunton, Va., amalgam fillings; Safford G. Perry, New York, use of separators; George J. Friedrichs, New Orleans, cylinder fillings; L. P. Haskell, Chicago, Ill., continuous-gum work; H. C. Herring, Concord, N. C., implantation; W. W. Brooks, Memphis, Tenn., Byrnes mallet; J. F. Griffith, Salisbury, N. C.; Henry W. Morgan, Nashville, Tenn.; C. E. Dunn, Louisville, Ky.; W. H. Keller, City of Mexico; A. A. Beville, Waco, Texas; J. H. Grant, Palestine, Texas.

*Publication Committee.*—B. H. Catching, Atlanta, Ga., chairman; W. O. Wardlaw, Augusta, Ga.; H. E. Beach, Clarksville, Tenn.

### VERMONT STATE DENTAL SOCIETY.

THE thirteenth annual meeting of the Vermont State Dental Society was held at Montpelier, Vt., March 20 to 23, 1889.

The following officers were elected for the ensuing year: W. H. Spencer, president; G. W. Hoffman, first vice-president; W. S. Curtis, second vice-president; Thomas Mound, secretary; W. H. Munsell, treasurer; G. F. Cheney, A. J. Parker, and C. F. O. Tinker, executive committee; G. W. Hoffman, state prosecutor. Dr. C. F. Lewis

was appointed delegate to the International Dental Congress at Paris, France, in September, 1889.

The next annual meeting will be held at Bellows Falls, on the third Wednesday in March, 1890.

THOS. MOUND, *Secretary*, Rutland, Vt.

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#### MASSACHUSETTS DENTAL SOCIETY.

THE semi-annual meeting of the Massachusetts Dental Society will be held at the Institute of Technology, Boston, Mass., June 5, 6, and 7, 1889.

The meeting will include papers, clinics, clinical conference, dental pharmacy, and technics. Invitation to be present is extended to members of dental societies.

E. O. KINSMAN, *Secretary*,  
Cambridge, Mass.

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#### DENTAL SOCIETY OF THE STATE OF NEW YORK.

THE Dental Society of the State of New York will hold its regular annual meeting at Albany, N. Y., on Wednesday and Thursday, May 8 and 9, 1889.

Members of the profession are cordially invited to be present and participate in the discussion of papers.

G. L. CURTIS, *Correspondent*,  
No. 14 East Jefferson street, Syracuse, N. Y.

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#### NORTH CAROLINA STATE DENTAL ASSOCIATION.

THE fifteenth annual meeting of the North Carolina State Dental Association will be held in Greensboro, commencing on the fourth Tuesday (25th) of June, and continue three days.

From present indications it promises to be the best meeting in the history of the association. It will be largely devoted to clinics. Several gentlemen of eminence, from abroad, will be with us.

H. C. HERRING, *Secretary*,  
Concord, N. C.

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#### NEW HAMPSHIRE DENTAL SOCIETY.

THE thirteenth annual meeting of the New Hampshire Dental Society will be held at Concord, June 18 and 19, 1889. All members of the profession in the State are earnestly requested to be present, and help to make the meeting a success.

EDWARD B. DAVIS, D.D.S., *Secretary*,  
Concord, N. H.



## GEORGIA STATE DENTAL SOCIETY.

THE twenty-first annual meeting of the Georgia State Dental Society will be held at Tybee, near Savannah, June 11 to 14, 1889.

L. D. CARPENTER, *Cor. Sec.*, Atlanta, Ga.

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## COLORADO STATE DENTAL ASSOCIATION.

THE Colorado State Dental Association will hold its third annual meeting at Denver, Colorado, beginning on the first Tuesday (4th) of June, 1889, and continuing three days.

H. P. KELLEY, *Rec. Secretary*,  
Denver, Col.

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## ILLINOIS STATE DENTAL SOCIETY.

THE twenty-fifth annual meeting of the Illinois State Dental Society will be held at Quincy, beginning at 10 o'clock, Tuesday, May 14, 1889, and continuing four days.

GARRETT NEWKIRK, *Secretary*,  
N. W. cor. Wabash ave. and Sixteenth street, Chicago, Ill.

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## SOUTH CAROLINA STATE DENTAL ASSOCIATION.

THE nineteenth annual meeting of the South Carolina State Dental Association will be held at Columbia, S. C., commencing on Tuesday, May 14, 1889, at 10 A.M.

A cordial invitation is extended to members of the profession to attend. A large and enthusiastic meeting is anticipated.

R. ATMAR SMITH, *Recording Secretary*,  
No. 285 King street, Charleston, S. C.

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## ILLINOIS STATE BOARD OF DENTAL EXAMINERS.

THE Illinois State Board of Dental Examiners will meet at "The Newcomb," in Quincy, on Monday, May 13, 1889, at 10 o'clock A.M., at which time candidates for examination must be promptly on hand.

Dentists holding diplomas from reputable dental colleges can obtain license by forwarding the same to the secretary, making the necessary affidavit, and paying a fee of one dollar. All others must appear before the Board and pass a satisfactory examination before license will be issued. The fee for each examination is two dollars.

Practical demonstrations in operative and mechanical dentistry, and satisfactory evidence of having had not less than three years' practical instruction and experience in operative dentistry, will be required.

CHARLES R. E. KOCH, *Secretary*,  
No. 3011 Indiana ave., Chicago, Ill.

## DENTAL COLLEGE COMMENCEMENTS.

### CHICAGO COLLEGE OF DENTAL SURGERY.

THE seventh annual commencement of the Chicago College of Dental Surgery was held at the Grand Opera House, Chicago, Ill., on Tuesday, March 26, 1889.

The class valedictory was delivered by Benjamin Franklin Eshelman, D.D.S., and the faculty address by Professor George H. Cushing, M.D., D.D.S. An address was also delivered by Rev. T. G. Milsted.

The number of matriculates for the session was one hundred and fifty-four.

The degree of D.D.S. was conferred on the following graduates by Truman W. Brophy, M.D., D.D.S., president of the board of directors and dean of the faculty :

NAME.	STATE OR COUNTRY.	NAME.	STATE OR COUNTRY.
William Seward Aldrich.....	Minnesota.	Frederick B. Merrill.....	New York.
Heber Bingham Barber.....	Illinois.	Lewis Albert Meyer.....	Wisconsin.
Harvey Herbert Bates.....	Illinois.	Frederick E. Morris.....	Illinois.
Hal Clair Billig.....	Wisconsin.	Ralph Waldo Morse.....	Indiana.
George Ernest Brownlee.....	Illinois.	William Henry Mueller.....	Wisconsin.
W.G. Campbell, M.B., C.M.	Scotland.	Byron Alonzo Nelles.....	Michigan.
Arthur Erwin Capener.....	Wisconsin.	Alfred John Oakey.....	Wisconsin.
Frank Eugene Cheeseman.....	Illinois.	George Howard O'Brien.....	Illinois.
James Agnew Cochran.....	Illinois.	William Judson Phillips.....	Illinois.
William Henry C. Cowen.....	Kansas.	Roscoe Robert Powell.....	Wisconsin.
James Albert Curry.....	Illinois.	Frank J. Raymond.....	Illinois.
Nelson Denique Edmonds.....	Indiana.	Anderson F. Reed, M.D.....	Colorado.
* Frank Stanley Eiles .....	Illinois.	Alex. McLeod Rivenburg ..	Illinois.
Follen Peabody Ellis.....	Wisconsin.	Edward Guilbert Robinson..	Iowa.
Benjamin F. Eshelman.....	Iowa.	Andrew William Rogers.....	Illinois.
Edward James Farrell.....	Illinois.	David William Runkle.....	Wisconsin.
Vincent Fischer.....	Illinois.	* Henry Read Sackett.....	Colorado.
Frank F. Fletcher.....	Colorado.	Herbert H. Silliman.....	Illinois.
Edward J. Flynn.....	Colorado.	Henry Patrick Smith.....	New York.
Horace Eugene Fox.....	Michigan.	John Wesley Smith.....	Illinois.
Enoch Morse Fredericks.....	Illinois.	Eli Slifer Straub.....	Michigan.
Clarence Albert Gleason.....	Wisconsin.	Joseph Atwood Swasey.....	Illinois.
William Preston Gorsline ..	Wisconsin.	Fred Strong Tabor, M.D.....	Illinois.
Arthur Grant Harrison.....	Illinois.	David Taylor, Jr.....	Wisconsin.
* Charles Wesley Harter.....	Iowa.	Irwin Francis Upson.....	New York.
Charles Cole Henry.....	Illinois.	Charles Edward Vernay.....	Illinois.
Will Ellsworth Hoffman.....	Illinois.	Electus B. Ward, M.D.....	Illinois.
Frank Milton Johnson.....	Illinois.	Thomas Martin Welch.....	Wisconsin.
Emil John Kautsky.....	Wisconsin.	Justus Allen White.....	Michigan.
Horace Greeley Logan.....	Minnesota.	Simon Willard, M.D.....	Illinois.
William Fletcher McCawley..	Illinois.	Frank Vincent Woodward.....	Kansas.
Frank Tyler McConnell.....	Wisconsin.	Clarence H. Wright.....	Illinois.

The honorary degree of D.D.S. was conferred on Dr. James Atwood Swasey.

\* Certificate of honor for attendance upon one spring term.

## EDITORIAL.

## THE INTERNATIONAL TOOTH CROWN COMPANY'S PATENTS.

THE International Tooth Crown Company complains that our publication of the objects of the Dental Protective Association of the United States, on page 316 of the April issue of the DENTAL COSMOS, is erroneous in so far as it may be construed to mean that the validity of *none* of the patents of the said company has been established.

We have been studiously careful to give only correct information concerning the rights and claims of the International Tooth Crown Company. In the DENTAL COSMOS for March, 1887, we gave the decision of Judges Wallace and Shipman in full, and in the issue for December following we published a statement of the controversy by Messrs. Beach and Gordon, the correctness of which has not been questioned. This statement was that the two patents Nos. 277,941 and 277,943 for "tooth crowns, etc.," to Cassius M. Richmond, and the patent No. 277,933, for "bridge," to Alvan S. Richmond, all dated May 22, 1883, were held invalid, and the patent No. 238,940, to James E. Low, for "method of supporting artificial teeth by bands cemented to permanent teeth," dated March 15, 1881, was declared to be good. Furthermore, the Low patent was described as covering "a bridge attached to continuous bands cemented to adjoining permanent teeth, 'whereby said artificial teeth are supported by said permanent teeth without dependence on the gum beneath.'"

It was added, "As the matter now stands, any dentist inserting a Richmond bridge (according to the decision) infringes the Low patent; and an injunction would doubtless now be granted by any Federal judge on application, on the strength of that adjudication alone."

We have rehearsed these facts in order that there be no misapprehension on the part of our readers as to their legal rights in the premises. In the editorial complained of we quoted from the circular of the Dental Protective Association the statement of its object, which was said to be "to contest the patents of the International Tooth Crown Company the validity of which has not been established." If the word "those" had been substituted for the first "the" in the quoted sentence, the meaning would perhaps have been clearer to the casual reader; but certainly no reader of the DENTAL COSMOS was justified in assuming that the meaning of the language was that *none* of the patents of the company had been established, for, as before stated, we had been careful to give explicit information as to which of their patents had been declared valid and which invalid.



## COLORADO'S DENTAL LAW.

FOLLOWING is the text of the law recently passed entitled "An act to insure the efficiency of practitioners of Dental Surgery and to regulate the practice of Dentistry in the State of Colorado:"

*Be it enacted by the General Assembly of the State of Colorado:*

SECTION 1. No person shall practice dentistry in this State until he or she shall have obtained a license for such purpose as hereinafter provided, but nothing in this act shall be construed to prohibit any physician or surgeon from extracting teeth.

SEC. 2. A State Board of Dental Examiners shall be and is hereby created, whose duty it shall be to enforce and execute the provisions of this act. The said Board shall consist of five members, who shall be appointed by the Governor, by and with the advice and consent of the Senate. Each member of said Board shall be appointed for the term of two years, and hold his office until his successor be duly appointed. Vacancies occurring in said Board shall be filled by the Governor.

SEC. 3. Said Board shall choose from its members a president, secretary, and treasurer thereof, and shall meet at least once in each year and as much oftener and at such times and places as it may deem necessary. The first meeting of said Board shall be held within sixty days after the time this act will go into force and effect, at the capitol of the State. A majority of said Board shall at all times constitute a quorum, and the proceedings thereof shall at all reasonable times be open to public inspection.

SEC. 4. Any person desirous of continuing the practice of dentistry within this State shall appear in person before said Board, at the first or any subsequent meeting of said Board, at such time and place as the Board may designate, and submit to an examination by said Board, to determine his or her ability to continue the practice of dentistry in this State. Provided, however, that the secretary of said Board may, upon application of any such person, issue a permit to temporarily practice dentistry until the next meeting of the Board, but no longer, unless the Board at such meetings shall extend said temporary permit, and such person making application for examination by the Board as aforesaid shall deposit with the secretary of said Board a fee of ten (\$10) dollars as compensation for making said examination. All persons who may be found qualified by said Board, upon any such examination, to continue the practice of dentistry in this State, shall receive from said Board a certificate signed by the president and attested by the secretary, under official seal of said Board, authorizing the holder thereof to thereafter continue the practice of dentistry in this State.

SEC. 5. Any and all persons who shall so desire may appear before said Board at any one of its meetings, and be examined with reference to their knowledge and skill in dental surgery, and if the examination of any such person or persons shall prove satisfactory to said Board, the Board of Examiners shall issue to such persons as they shall find, from such examinations, to possess the requisite qualifications, a license to practice dentistry in accordance with the provisions of this act.

SEC. 6. Any person who shall violate any of the provisions of this act shall be deemed guilty of a misdemeanor, and shall be liable to prosecution before any court of competent jurisdiction, and upon conviction may be punished by a fine in a sum not less than one hundred (\$100.00) dollars, nor more than five hundred (\$500.00), or by imprisonment from one to ninety days, or both, in the discretion of the court. Each day that this act is violated shall be considered a separate offence.

SEC. 7. Said Board shall be authorized, out of the funds coming into its possession from the fees authorized by this act, to pay to each member thereof such compensation as the Board may determine, and all legitimate and necessary expenses incurred in attending the meetings of said Board. Said expenses shall be paid only from the fees received by the Board under the provisions of this act, and no part of the compensation or other expenses of the Board shall ever be a charge against or paid out of the State treasury. All moneys received in excess of said expenses shall be held by the treasurer of said Board as a special fund for the meeting of the expenses of said Board, by giving such bond as the Board shall from time to time direct. Said Board shall make a bi-annual report of its proceedings to the Governor, by the fifteenth day of December of the year immediately preceding the next ensuing session of the Legislature, together with an account of all moneys received and disbursed by them pursuant to this act.

I hereby certify that I have compared this copy with the original and find it to be correct.

P. C. FRENCH,  
*Chief Enrolling Clerk.*

The following constitute the Board of Examiners appointed by the Governor in pursuance of the provisions of the act: J. N. Chipley, D.D.S., Pueblo; P. T. Smith, D.D.S., Denver; J. M. Porter, D.D.S., Denver; M. J. Norman, D.D.S., Denver; and Eugene Fowler, Colorado Springs.

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## BIBLIOGRAPHICAL.

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THE PSYCHIC LIFE OF MICRO-ORGANISMS: A Study in Experimental Psychology. By ALFRED BINET. Translated from the French by THOMAS McCORMACK. With a Preface by the Author written especially for the American edition. 120 pp. Chicago: The Open Court Publishing Co., 1889. Price, cloth, 75 cents.

The author of this little volume has endeavored to "show that psychological phenomena begin among the very lowest classes of beings; they are met with in every form of life, from the simplest cellule to the most complicated organism. It is they that are the essential phenomena of life, inherent in all protoplasm." The table of contents indicates the consideration of the definition and classification of micro-organisms, of their motory organs, organs of sense, nervous system, nutrition, fecundation, etc.

It is an exceedingly interesting and instructive monograph, and well worthy the study of every student of nature.

A STUDY OF MAN AND THE WAY TO HEALTH. BY J. D. BUCK, M.D. Octavo, pp. 302. Cincinnati: Robert Clarke & Co., 1889.

We have in this volume an exposition and simplification of the fundamental principles upon which a clear and comprehensive know-

ledge of life in general, and of human life in particular, may be acquired. The histologist, physiologist, pathologist, and microscopist will have reason to thank Dr. Buck for fresh ideas regarding the nature and scope of life. The author aims at the reconciliation of science and religion in the logical application of one universal law that is coincident with all nature and commensurate with all life,—a law which does not subvert but supplements the theory of evolution by involution.

The type, paper, and binding of the volume are all that could be desired.

HOME GYMNASTICS, for the Well and the Sick. Adapted to all Ages and both Sexes, etc. Edited by E. ANGERSTEIN, M.D., staff physician and superintendent of the Gymnasiums of the City of Berlin, and by G. ECKLER, head teacher of the Royal Institution for training teachers of gymnastics. With many wood-cuts and a figure plate. Translated from the Eighth German Edition. Large octavo, pp. 94. Boston and New York: Houghton, Mifflin & Co., 1889. Price, cloth, \$1.50.

This excellent translation of a popular German work by Professors Angerstein and Eckler, of Berlin, aims to provide men, women, and children with a simple, natural, and effective system of physical exercise, without the complicated and expensive paraphernalia of the gymnasium. For all people whose occupations confine them to the house or office, this book contains valuable hints. In making this commendation we have specially in mind the dental practitioner, whose close application, often in uncomfortable or constrained positions, is apt to result in a depression or exhaustion of the muscular and nervous systems. The methods here taught and illustrated would tend greatly to the prevention and alleviation of the disabilities which so frequently overtake the professional man.

#### PAMPHLETS RECEIVED.

Transactions of the California State Dental Association, at its eighteenth and nineteenth annual sessions, held at San Francisco, commencing July 19, 1887, and July 17, 1888. Octavo, 300 pp. San Francisco: Bacon & Co., 1888.

Transactions of the Dental Society of the State of New York, at its twentieth annual meeting, held at Albany, N. Y., in May, 1888. Rochester: John P. Smith, printer, 1889.



## OBITUARY.

## SAMUEL E. GREENE, D.D.S.

DIED, at Newport, R. I., February 6, 1889, of tuberculosis, SAMUEL E. GREENE, D.D.S., in the thirty-eighth year of his age.

Dr. Greene was born in Exeter, R. I., August 22, 1851. He commenced the study of dentistry with Dr. A. A. Saunders, of Newport, with whom he afterwards became associated in practice, graduating from the Philadelphia Dental College in the class of 1873-74. Upon the death of Dr. Saunders, in 1879, Dr. Greene succeeded him, conducting a large and thriving practice up to within a few months of the time of his decease.

Quiet and unostentatious in manner, of a kindly disposition and gentlemanly deportment; an earnest worker in his profession, upholding its standard by steady upward endeavor and skillful example; a devoted husband and father: he leaves a large circle of personal and professional friends in the community where his life has been passed.

## DR. J. S. JENKINS.

WE have received the following letter from Dr. W. St. George Elliott, of London, England, in reference to the death of Dr. J. S. Jenkins, of South America. Dr. Elliott writes:

TO THE EDITOR OF THE DENTAL COSMOS:

DEAR SIR,—Having lately heard of the death of Dr. Jenkins, of Callao, Peru, I have thought that a few remarks in regard to him might be interesting to the profession.

Dr. Jenkins served his time as an apprentice in the machine-shop of Ross Winans & Co., in Baltimore. His father, an artist of some celebrity, lived in Cuba, and young Jenkins at the expiration of his time being anxious to see his father, and not finding other means of getting there, walked from Baltimore to New Orleans, where he took vessel. For a time he was employed as engineer on a sugar estate. Being thrown in contact with some dentists, his attention was called to the profession which he subsequently took up; he went to Texas and opened practice, but owing to some domestic trouble gave it up and went to New Orleans. Being of an adventurous spirit, he subsequently went to and worked a gold mine in Mexico; this not proving particularly profitable, he got an estate and commenced the culture of mangoes; during his absence one day a cyclone destroyed what little property he had, and the California gold fever drew him to that State. Failing to do much in the gold mines, he became a noted billiard-player in Sacramento and San Francisco. The adventurous spirit still being upon him, he went with a friend to Peru, about 1852, and commenced practice as a dentist; found nothing to do, and assisted in the erection of gas-lamps and other work of similar character; subsequently got a contract to make guano-bags, and just as he was about to make something out of this he lost the contract. He then went into making sewing-machine needles. Taken down sick with fever, he nearly

died of starvation. He afterwards recommenced practicing dentistry ; gradually picked up a practice, and when I first met him in 1877 his name was known all over the west coast of South America. I was in partnership with him for a short time while in Peru, and have heard occasionally of him through patients since that time. He was a remarkably good dentist and an honorable gentleman.

Truly yours,

W. ST. G. ELLIOTT.

39 UPPER BROOK ST., W., March 4, 1889.

### JOHN Q. DICKERMAN, D.D.S.

DIED, at Taunton, Mass., March 11, 1889, of paralysis, JOHN Q. DICKERMAN, D.D.S., in the sixty-first year of his age.

Dr. Dickerman was born in Marlboro, Mass., May 16, 1828. He was one of the oldest practitioners of dentistry in the State, having been in active practice forty-one years. He graduated from the Boston Dental College in 1871.

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### PERISCOPE.

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AN ARTIFICIAL CHEEK, EYE, AND PALATE.—Mr. Henry Morris published, in the *Journal* of April 21, 1888, page 850, a case in which he removed a large recurrent myeloid sarcoma of the face. After the operation a large chasm remained, the roof of which was formed by the roof of the orbit, its inner wall by the septum of the nose, its outer wall by the outer wall of the orbit, pterygoid processes, and ascending ramus of the lower jaw ; the floor was formed by the tongue and a portion of the soft palate, which was left intact. Posteriorly it communicated with the pharynx by a wide opening, in which, behind the posterior edge of the nasal septum, the trumpet-shaped orifice of the Eustachian tube of the sound side was fully exposed to view.

The aspect of the patient after the operation is shown in Fig. 1, and it must be admitted that his appearance was very forbidding. The absence of a great part of the soft palate rendered his speech almost unintelligible, and, though happily relieved by Mr. Morris's bold operation of the terrible disease from which he had suffered, the condition in which he was left was deplorable so far as social relations are concerned. His case at this stage was undertaken by Mr. Charles A. Hayman, L.D.S., of Bristol (dental surgeon to Muller's Orphanage, Bristol, the Clevedon Hospital, etc.), who has fitted him with an artificial cheek, eye, and palate, by which he is enabled to speak intelligibly, and which have very much improved his appearance.

Mr. Hayman encountered great difficulty in obtaining a model of the mouth, but this being at length overcome, an ordinary upper plate was made in the usual way ; a fresh difficulty now arose owing to the absence of one side of the palate, so that the obturator

could not easily be held in place; to overcome this a slight flange of vulcanite was extended to fit outside the face, in front of the ramus of the lower jaw and against the septum of the nose; then a large wedge of vulcanite was added, to fit into the posterior nares. This had the desired effect; the palate was secure, and speech and mastication considerably improved.

With the obturator in position, a model of the remaining hollow was taken, and from this a silver plate was struck, which fitted accurately into the hollow and under the right ala of the nose; a small tongue of silver was adjusted over the bridge of the nose, and on to this the spectacles were subsequently soldered. An artificial

FIG. 1.



cheek and eye were then modeled in wax to match the other side of the face. A second silver plate was then struck upon a metal cast taken from this model, and soldered to the inner plate as a cover is fixed to a box. An artificial eye was then fixed to the plate in the proper situation, and the face painted flesh-color and japanned. In order to keep the mask in position a strong wire, fixed to the posterior edge of the artificial cheek, passes around the right ear, and the ear-pieces of the spectacles are joined behind the head by an elastic band.

Fig. 2 is a somewhat flattering portrait of the patient wearing



the artificial cheek and spectacles. His appearance is undoubtedly considerably improved, and, apart from this, the obturator enables

FIG. 2.



him to eat without difficulty and to speak distinctly.—*British Medical Journal*.

## HINTS AND QUERIES.

**COPPER AMALGAM.**—In 1886\* I described a new method for making dental amalgams by electric deposition. In this paper particular attention was called to the value of this new method for producing copper amalgam, the mass so produced being perfectly free from the presence of other metals; and moreover it contained no copper oxides or sulphides, and on this account was stronger when hardened.

This new method has led to the somewhat extensive introduction of copper amalgam. I wish on this account to give the results of several years' observation on this material when used in filling teeth. I was led to its extensive use in my practice through the statements of several eminent men, who said that it was free from shrinkage, did not change its shape, and did not discolor the teeth, when pure. My experience shows that all these statements are false. In mouths in which decay is not rapid, copper amalgam turns dark from the formation of a sulphide, and

\* Boston Medical and Surgical Journal, page 175, 1886.

preserves the teeth as well as the average gold filling. In such mouths the teeth are usually of good structure, and are not stained by the filling unless they are pulpless, in which case discoloration of the substance of the dentine is sure to be simply a matter of time. Discoloration of the surfaces of the teeth is always present to a greater or less degree, however.

In mouths in which the saliva is still more abnormal, and in consequence of which the teeth decay rapidly, the amalgam does not turn black as a rule, at least there are periods in which the surface is either wholly or partly clean. I have seen copper amalgam fillings lose half their weight in such mouths in two years' time. A loss of five per cent. a year is common. In cases of rapid loss of substance the surfaces of the fillings show a fine crystalline appearance not unlike that of the fresh fracture of high-grade steel. In such cases it cannot be denied that as a preserver of the teeth from caries the filling is of value; but until it can be shown that the continual introduction of so much copper and mercury into the system is harmless I advise caution in the use of copper amalgam.

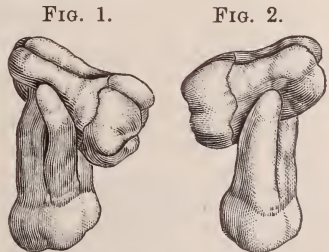
Finally, copper amalgam changes its shape after it is introduced into the tooth, and therefore does not make a tight filling. This is so contrary to all that has been said on this subject that I am prepared to have the statement doubted, but nevertheless it is a fact.

It is best to test this matter in a simple way first, after which careful tests of the specific gravity can be made to prove it. I recommend using large amounts (20 grammes) of the filling, and packing it into large glass tubes, which are kept at a temperature not varying widely from that of the mouth. It will be seen that the first appearance of leakage is greatest near the surfaces of the plug, and that as the change in shape progresses the ink penetrates deeper and deeper between the glass and the filling; indeed, the action of the fluid is such as to suggest the truth of the statement about the spheroidal tendency of amalgams.—WILLIAM HERBERT ROLLINS, Boston, Mass.

**DENTAL ANOMALY.**—This notable example of cemental fusion of the roots of two fully-developed human molars was extracted from the superior left maxilla of a lady aged about forty-five years. The crown only of the second molar (Fig. 1) was in sight, suitably occluding with the inferior molar, and without any recession of the gum; although the bicuspid of that side had long been lost. It was easily extracted upon first removing the buccal plate of the process after finding that there was something abnormal connected with the roots. The patient could remember no uneasiness attributable to the tooth, in which, many years ago, two small amalgam crown fillings had been placed, and which are yet perfect. Fig. 2 represents the palatal aspect of the anomaly, and in both figures it will be noticed that the teeth are completely formed and that the crown of the third molar is unusually large.

The illustrations imperfectly show the overflow of the cemental substance on the buccal roots of both teeth (Fig. 1), and the buccal and palatal roots of the third molar (Fig. 2). The fact is indicative of a wide extension of the dento-plastic irritation induced by contact with the second molar in the efforts of the misplaced third molar to reach its proper place after its normally formative processes had been finished.

The union of the several roots at the points of impingement is as complete as



if the junction had been congenital; yet the buccal and the palatal roots of the second molar were at their bifurcations separated from each other and from the third molar by thin septa of the alveolar process. The integrity of the several pulps and their branches seems in no wise to have been affected, neither was the third molar crown in any way impaired by its long submergence, but every one of its eight tubercles and their lines of blending are as perfect as when first formed.—WILL S. PAYSON, D.D.S., Castine, Me.

IN CAPPING PULPS I employ an instrument having a cup-shaped end, like that illustrated in the accompanying figure, for use as follows: With a hollow punch, cut from thin tin foil a disk somewhat larger than the cup; lay the disk on a piece of soft rubber; place the mouth of the cup over the disk, press lightly on it, and its border will fold around the edge of the cup so that the tin cap thus formed will remain on the instrument. Fill the cap with cement and carry it to its place in the cavity of the tooth. The cap adheres to the cement and remains in the cavity, allowing the removal of the instrument without displacement of the cap or contact of the instrument with the cement.—G. H. COLLINS, Lincoln, Neb.



SPYER'S GOLD-FORMERS.—During the flasking process, the pressure of the rubber upon the papillæ of these formers frequently flattens them, and so weakens the adhesive properties they should impart to the bearing surface of the denture.

Dr. D. Genese mixes plaster with thin mucilage, and carefully fills all the pits in the gold side of the former. This is then quickly adapted to the plaster cast so as to closely fit it without leaving any of the mixture between the former and the cast except in the depressions, where it will soon harden and stick the former to the cast at the same time, preventing the flattening of the little prominences by the pressure of the rubber during the closing of the flask.—H.

I HAVE a device which I use on my vulcanizer, and find that with it I *save some gas* and maintain a more even temperature. Before using this, I am satisfied that I have vulcanized ten or more degrees too high.

It is a tube one and one-half inches in diameter and five inches long, made of a thin sheet of mica, bent and riveted by a tinsmith. Both ends are open, and I lay a small piece of tin on the top for a cover. It is set over the vulcanizer thermometer, and being transparent does not obstruct the view.

Cost, 25 cents.—W. H. CRAIG, Oakland, Cal.

DURABILITY OF FILLINGS BY THE HERBST METHOD.—At a clinic by Dr. W. Herbst at the S. S. White depot in New York, in August, 1886, five approximal and two labial cavities were filled by the rotation method, and appeared to be quite perfect under careful examination. The patient, Dr. J. E. Da Silva, subsequently came under my care, and I found the cavity of every approximal Herbst filling showing a lining of decay at the cervical and palatal borders to an extent that necessitated the removal of each of those fillings. The labial fillings were in better condition, and because the patient was about to sail for Europe there was not time for removing them and refilling the cavities. Dr. Da Silva is very particular in the care of his teeth, and it was through no fault of his that the fillings failed. There was no overlapping of the gold, but it was not condensed at the borders, and so failed to preserve the teeth. The decay was of a white, chalky nature, and the teeth very sensitive.—T. W. ONDERDONK, D.D.S., New York.



# A MONTHLY BIBLIOGRAPHY OF DENTAL LITERATURE.

COMPILED BY J. MELVIN LAMB, M.D., WASHINGTON, D. C.

THIS bibliography will be continued monthly in the DENTAL COSMOS, and will furnish as complete a record of dental literature as can be gleaned from current periodicals and transactions of societies.

The abbreviations of titles used are those common to bibliographical work, and will, it is presumed, be readily comprehended by any one familiar with dental or scientific publications. Any explanation will be gladly furnished by the compiler.

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## ORIGINAL COMMUNICATIONS.

### PROFESSIONAL ATMOSPHERE AND MORALS; OR, PATENTS AND SECRETS VS. A LIBERAL PROFESSION.

BY HORATIO C. MERIAM, D.M.D., HARVARD UNIVERSITY DENTAL SCHOOL.

(Address delivered before the New York Odontological Society March 19, 1889.)

MR. PRESIDENT, AND FELLOW-MEMBERS OF THE NEW YORK ODONTOLOGICAL SOCIETY:

It is natural to those who see the broad right of way that the liberal professions have held through literature, science, and art, to ask the source of that right, how acquired and maintained.

In a commencement address before the Dental and Medical Schools of Harvard, in Boston, in 1871, the Rev. Edward Everett Hale gave the difference between a body of professional men and a body of craftsmen. He held that every diploma given in a liberal profession contained three pledges which those who received them bound themselves to maintain by accepting: a pledge to learn for all; a pledge to practice for all; and a pledge to teach freely to all. These three,—to learn for all, to practice for all, and to teach for all,—uniting as they do past, present, and future, and implying freedom, are laid as a foundation, whereby we may test the claim of dentistry to be a liberal profession, and its practice that of a specialty of medicine.

I do not propose to go beyond these obligations to-night.

Dr. Hale has not given authority to them, but whether his opinion or that of others, they concern us as a statement of the law of a liberal profession, the observance of which prolongs and strengthens its life, and the neglect or abandonment of which would be followed by professional death. The obligation to learn and teach brings to the front the position of doctor, or *teacher*.

The doctor's position has always depended on his fidelity as a teacher. Your *nostrum-vender*, or maker of proprietary articles or medicines, who will not teach the making or their formulas, is one



who disgraces this position and has no right to the title. So, also, if a discoverer or inventor in a liberal profession patents the requirements of his profession, making them his exclusive property, and, in the language of the Patent Office, secures "the exclusive right to make, vend, and use" them, he violates the pledges of his diploma, and has lost his claim to belong to a liberal profession.

Mr. Ruskin asks, in one of his essays, why it is that the clergyman, the lawyer, the physician, the army or navy officer receive more honor or hold a higher position in the opinion of the world than does the merchant, in proportion to the time spent in acquiring the essential knowledge. And he answers it by saying that the world has wrongly accepted the merchant at his own estimate, that he works for money and may decide without loss of prestige always in favor of those transactions that pay him best; whereas, in the professions, the world recognizes that each must often turn from that which pays best to that which is the most dangerous or least profitable. The lawyer may become a judge, and must refuse bribes, or to sit in cases in which he has a personal interest, or take advantage of knowledge, in a pecuniary way, which has come to him while hearing cases. The clergyman who neglects the care of souls or to teach truth for more profitable work, or who preaches error or falsehood if it pay best; the physician who would not face contagion; the army or navy officer who would not risk his life, or who would retire on the eve of battle, for the sake of money,—are all without honor.

Agassiz, in his will, wrote himself "Louis Agassiz, Teacher," selecting this title in preference to all others. While conducting some experiments in his laboratory, he received an offer of a large sum from the West for a course of lectures on natural history. He replied, "I cannot afford to waste my time in making money." This reply, natural to him, aroused great wonder, and Agassiz wondered that they wondered. He knew that hundreds of men both in this country and in Europe would have given the same answer. To a business man, the fact that a scientist was too busy to make money was a revelation. This brought the fact before them, and gave science in America a position and stimulus that it feels to this day. From that time on, money flowed to Agassiz in a continuous stream, and he who afterwards said that he never was a quarter of a dollar ahead in his life and never expected to be, found himself in a position to call for money as often as he needed it for science, and it came. He made the title of teacher almost glorious, and left a name that has been to science in America a continual benediction.

"This wonderful creature," as an admirer describes him, called not only money but men to his aid. From the emperor of Brazil

with his mountains, to the farmer and laborer, who would leave their work to dig for him a specimen, all helped. There was the personality of the man, to be sure, added to science; but the scientific test for a scientist was the same before and is the same to-day, *Fidelity to their obligations as teachers.*

The article by the Duke of Argyle called "The Great Lesson" is of interest as illustrating this, and the atmosphere and morals of science, the integrity of its teachers, and the obligations to truth which they acknowledge.

The voyage of the "Beagle" ended in 1836, during which Mr. Darwin made his observations, and framed his theories of the formation of the coral reefs and islands. More than thirty-five years after, the "Challenger" expedition, with Mr. John Murray as naturalist, was sent out. He "made observations and drew conclusions that called for a new explanation." (I quote from the duke's paper.) "This was communicated to the Royal Society of Edinburgh in 1880, and supported by such a weight of facts and such a close texture of reasoning that no serious reply has ever been attempted. At the same time the reluctance to admit such an error in the great idol of the scientific world, the necessity of suddenly disbelieving all that had been believed and repeated in every form for upwards of forty years, of canceling what had been taught the young for more than a whole generation, had led to a slow and sulky acquiescence rather than to that joy which every true votary of science ought to feel in the discovery of a new truth, and not less in the exposure of a long-accepted error."

The charges so distinctly made by the Duke of Argyle soon received a warm reply. It was held he had charged the leading scientists of England with a "conspiracy of silence;" that they were so anxious to guard the memory of Darwin and to preserve his theory that they had refused to investigate truth; in other words, had formed a "Trust," or what we now know as a "Combination," to exclude all competing discoverers and prevent by silence free discussion of scientific questions, and discourage investigators, and by so doing they were guilty of conspiracy. Professors Huxley and Bonney replied warmly, the former not only to the duke but to a preacher whom he calls "Anonymous," and said, "For, not content with misrepresenting science on its speculative side, 'Anonymous' attacks its morality; thus: 'For two whole years investigations and conclusions which would upset the theories of Darwin on the formation of coral islands were actually suppressed, and that by the advice of those who accepted them, for fear of upsetting the faith and disturbing the judgment formed by the multitude on the scientific character, the infallibility of the great master. . . .'"

Prof. Huxley denies the truth of this, and says, "The charge thus brought by 'Anonymous' affects the honor and the probity of men of science; if it is true, we have forfeited all claim to the confidence of the general public."

Prof. Bonney was not less decided, and says, after quoting the duke's article,—

"This is plain speaking. In words that admit of no ambiguity the duke declares that Darwin was wrong; that Mr. Murray set him right; and that the latter, instead of receiving a welcome, was met with a virtual conspiracy of silence on the part of scientific men." He denies the first two, and says,—

" . . . . We come then to the third charge, which is the most serious one, because it affects the morality of scientific men; and many of them, like myself, are old-fashioned enough to resent being called a knave more than being called a fool. Has Mr. Murray been met by a conspiracy of silence?" He denies this also and shows that it cannot be true, and adds, "Men of science are justly sensitive on this question. Doubtless they are not more exempt from human frailty than any other class of men; we all fail sometimes, nay, too often, to live up to our ideal standard; still such shortcomings are not common, and anything like a 'conspiracy of silence' or any kind of scientific boycotting is a thing so improbable as to be almost incredible."

This, then, of the scientific men of the day. You may reply that these are questions of pure science, or not connected with medical practice or its temptations. True; but physicians would claim to be actuated by scientific motives, and be governed by the same liberal principles, be under the same moral obligations, and wish to rank among those who are bidden by their diplomas "to own no master but Truth."

Let us turn to law. "I hold," says Lord Bacon, "every man a debtor to his profession from the which as men do seek to receive countenance and profit, so ought they of duty to endeavor themselves by way of amends, to be a help and ornament thereunto. This is performed in some degree by the honest and liberal practice of a profession when men shall carry a respect not to descend into any course that is corrupt and unworthy thereof, and preserve themselves free from the abuses wherewith the same profession is noted to be infected; but much more is this performed if a man be able to visit and strengthen the roots and foundations of the science itself, thereby not only gracing it in reputation and dignity, but also amplifying it in perfection and substance."

Here again is the obligation to serve their profession recognized as binding on its members. And it is a position, "as one sees the



long line of scholars, poets, and sages, and reads of the college cloisters and quadrangles of Oxford and Cambridge, whose very stones seem happier for being there," to desire that our profession should take its place among them, and say, "These are for us too." So we all felt a great pride when dentistry was admitted to universities, and dental schools established. Now we wish for such advance in liberality that they shall not be training-schools where the useful and needful only are taught, but where dentistry is taught as a liberal, free, and learned profession; and rightfully hope that the universities will raise the teaching of dentistry to the university standard, and not lower the university standard so that graduates in dentistry cannot claim to be the equals in liberality with those of divinity, law, and medicine.

Who would have expected that Dr. Rollins, one of the brightest men who has been graduated from the dental school at Harvard, could have written what I shall presently quote, and still less that it should have passed uncontradicted by any dental school or society in America?

"So long," he writes, "as members of the profession who patent their inventions and make money on them are honored to the highest extent in our power by being asked to be leaders in our schools and before societies, so long will dentistry remain a trade, and I for one shall be ashamed to use my dental degree."

Is not dentistry in a position to resent this? Resent it if we please; still, like unsettled questions which have no respect for the repose of nations, it will not down if true.

A leading American practitioner writes me, "We are fast becoming a mere tender to a trade association, and about all the liberty there is left us is the right to buy goods."

Is dentistry, then, in a different position from that of other professions that claim to be liberal? There are, of course, those who have taken the degree of Doctor of Medicine as covering the whole, and who do not care for a partial degree in medicine or surgery; others find that the recognition of the dental degree by the American Medical Association is all that is needed; but these leave the point untouched. Has the dental profession of to-day the morals and atmosphere that entitle her to be called a liberal, free, learned, or scientific profession, and to rank with divinity, law, and medicine?

It will not do to trust to medical degrees to entitle dentistry to this position, for they may be obtained for use as a pass-word or for patronage or influence; and a medical degree, or education, or membership in the American Medical Association, intended strictly for publication and not as a guarantee of faithful assumption of the

liberal obligations they have always implied, will not avail much for the elevation of the profession.

There are some who quote the irregular practices of off-color physicians as affording a shield for themselves, and a hope that the American Medical Association will not look too closely into dental exclusiveness. To be of real value to dentistry, the recognition of it must call on us to leave quack ways and methods behind. We are not ambitious to rank with off-color physicians, or to make by reason of patents and secrets an off-color section in the association. We do not want it to shut its eyes to violations of the code to admit us, and thus step backward. Let them provide that all papers, clinics, and exhibitions given be up to the standard of the other sections, or else their recognition of dentistry will be a curse and not a blessing.

Since, then, we are to go behind the degree to the teaching, from the title to the doing, we ask, is dentistry, with all its titles and degrees, in a different position from the professions that rank as liberal?

The student of divinity must satisfy the denomination which he elects of his fitness, comply with the laws of the State, and so long as he conforms with its tenets need not fear that one of his brothers will invent a scheme of salvation which he will sell to a company which will charge him for its use, or will keep to himself the "exclusive right to make, vend, or use" it; but, on the contrary, may look forward to the day when some university or seat of learning shall give him, as among its highest honors, the title of Doctor,—*Teacher of Divinity*.

The student in law must pass his examinations, comply with the laws of the State and the rules established by his profession, and may then be free to serve his clients, and may avail himself of all the past and present experience of others without let or hindrance, and need not ask consent of a fellow-member to improve a process or serve one, for no one of them has by patent the power to prevent him, or is the owner of a secret (legal) remedy.

The student in medicine must reach the educational standard of his school, comply with the statutes of the State regulating the practice of medicine, and he is free also within these limits. He may have made or may improve instruments without asking permission of his fellows; may perform operations without obtaining a *license from a company, or leave from another*. He may ask the formula of any medicine that claims to be scientific, call for aid in consultation whenever needed; call for information, as a right expect a reply giving it,—all by reason of being a liberal, or member of a liberal profession. He may be sure that he is at liberty to perform any

operation he has seen done at a hospital clinic without fear of subsequent litigation; may order instruments without fear that litigation will prevent their delivery.

Now, is the dental profession as free or as liberal? For years we were under the rule of a Rubber Company, the last part of the time through the purchase of a patent from a dentist. The present Tooth Crown Company will hold the profession, if successful, by virtue of aid given by dentists, by the men who formed it being received at clinics and introduced without the improvements or operations being given fully to the profession. In fact, to use a homely illustration, they were "given with a string tied to them so that they could be pulled back—and the profession pulled in."

The student in dentistry is taught with patent instruments, uses daily filling-materials whose formulas the instructors do not know; and, after passing examinations and fulfilling the legal requirements of the State, must, if he wishes to practice all that is published in his text-book regarding operations, pay, or buy a license from others, or expect litigation. He will find the instruments of his profession so handicapped with patents that all makers are not at liberty to serve him. They can withhold, or decline to make, and refuse to permit others to do so. This power has been given them by his brothers, who have sold to them the "exclusive right to make, vend, or use." They can direct him to cease improving an instrument, because they have bought from a brother the patent which covers it, and have thus secured this power. Even a better instrument cannot be introduced when this power has been sold to those outside of the profession. If he is studying any question which involves instruments or processes, he may find himself obliged to ask the permission of his brothers to work at the problem, or else I mistake in my reading of the foot-note to an article by Dr. Bogue in the DENTAL COSMOS of March, 1885, where we are informed that "Dr. Jarvis was the first to separate teeth by means of a screw, that Dr. Perry had improved on this instrument, and that, with the *permission* of both these gentlemen, Dr. Bogue had been working on the problem for several years." These are three well-known names in the profession; one has *had permission* to work on the problem of separating teeth. He may find, after becoming a member of societies and listening to papers read at the meetings, or when he reads his own journals, that papers seem to be written to help the sale of appliances that destroy his independence, that men clinic to advertise instruments, or that clinics are used to introduce quacks or quack methods. That if he ask information at a meeting or clinic regarding a compound he may be refused by the person presenting it; find, after witnessing an operation, that he must take out



a license before introducing it in his practice. This license may involve conditions, and be taken from him at any time for non-fulfillment of them.

It is possible for a Sixth or Eighth avenue dentist to purchase the entire right for New York City, and those who practice between Sixth and Madison avenues become dependent on him for permission to study or use. He may demand the right to inspect books at any time, have them brought to him, or prescribe in what form they shall be kept, have the lists of patients for whom the operations are performed sent to him as often as need be, and rightfully refer to any he controls as "a man who works for me." It often calls for as much expense in time and thought to prepare a paper or perfect the details of an operation as to invent an instrument. The dentist who is obliged to pay his brother for the right to use instruments, may not be able to invent another, and so "get even." He may, however, be able to devise a new way of filling, or process of construction, and as he cannot dispose of this like an instrument, he must sell to a company who will "work it on the license or royalty plan." For, bear in mind that up to this time we have not been willing to face the question of the falsehood of patents in a liberal profession, but have admitted their place in dentistry, and have only fought to test the legality of those where license or royalty has been asked. We strain at the gnat of the Tooth Crown Company, but swallow without trouble the camel of illiberal patents and secret materials. We should be teachers, not traders, and condemn alike all the men who sell the profession into the hands of trade. At the present time some are selling the control of instruments to makers, others processes and operations to companies who wish to license; thus providing an upper and a nether millstone between which the great body of the profession can be ground exceeding small.

Many patent defenders say that a man should get his pay for time and labor. With this simple statement there can be no quarrel. The professional view is this: that in getting his pay, he is under moral obligation not to injure his profession, nor by reason of his invention give power over the profession or any fellow-member to any one. That if by reason of it he has aided oppression of makers of limited means, or has subjected them to litigation, he makes himself and the profession a party to illiberal motives and tendencies. In a liberal profession mutual help, exchange of thought, whether embodied in instruments, essays, or consultations, should be a sufficient compensation, and it is so held in the medical profession.

I read with shame and professional humiliation of a teacher who makes an appliance of a secret material, patented, so that no one else can make it, sold through a "sole agent" to combination dealers only.

Exclusive in conception, exclusive in execution, exclusive in manner of distribution. When this is the teacher, what will be the student?

I am frequently met with the remark, "I guess if any of those professional fellows got up a good thing they would patent it and make what they could out of it." True, perhaps, but I have yet to learn that that is the question under consideration. The point is, that having done so and secured from the government the power to prevent all others from "making, vending, or using" without my consent, the power to put fellow-members under tribute, or sold to others that right, can I claim a right to continued association with them on equal terms? Can I claim to be a liberal member of a liberal, *free*, profession, having aided to bind it? If a man will not work, neither shall he eat. If he will not give, how can he claim the right to receive?

We may, in our poverty, envy Cummings, who sold us for money to the Dental Vulcanite Company, and say we would do the same if we had the chance, and that Dr. Barnum was a fool not to do so; speak of the advantage that rubber plates have been to thousands. But when we talk of ethics we should know that we were not free men or a free profession during those years of disgraceful bondage; the atmosphere was a trade atmosphere, and the men developed in it not professional men, and it has left a stain of trade on our profession that may never be effaced.

Our constitution secures patents as property, but there are higher powers than constitutions. Patents were legally granted under it for explosive bullets, but civilized men have not used them against each other, as the object of modern warfare is not to destroy life, but to settle questions.

According to Blackstone, the government grants a patent in return for such information as placed on record will enable others to construct or use the article or process after the period for which its exclusive use was granted has expired; in this way overcoming the tendency of mean natures to conceal information, or withhold knowledge from others.

"If your work be mean," says Emerson, "try by your thought and feeling to make it liberal." Physicians, as members of a liberal profession whose first object is not to acquire power, are by reason of their membership under obligations to teach, and do not need the stimulus of a patent to make them record knowledge or aid each other or mankind; and while the constitution will give them the right to patent, they do not wish, as honorable gentlemen, to avail themselves of the power it gives to exact or withhold from each other what their privilege of membership in a liberal profession always implies should be given freely.

I went through the Children's Hospital, in Boston, and after passing through the wards asked to be shown the workshop where their instruments and apparatus are made. I said to the surgeon who attended me, "It is as important that you should have those men under your control to make as you direct, as to control the nurses. Allow them to patent those instruments, or patent each improvement that helps you overcome some new difficulty, and sell the control to them, and it would be but a few years before they were exercising more authority over the instruments used in the hospital than you." Then I told him the whole story of the shameful, illiberal condition of dental practice: that instruments ordered could not be delivered on account of the quarrels and litigation among makers; that honorable practitioners had been forced by threats of litigation to take out licenses to perform operations and pay a commission on the amount received,—were obliged to allow the company liberty to examine their books; that I had heard that upwards of a hundred orders for one instrument could not be filled, because dentists had sold to makers the power to control instruments their fellow-members needed; that valuable instruments could not be introduced because patents were thought to cover them, and, by having purchased those, makers could threaten with litigation any one who proposed to make them; that certain instruments were held for lease and not sold, that a license and percentage were to be charged for their use, and that this license could be revoked at any time for non-payment. He exclaimed in astonishment, "Are dentists in such a hole as that?"

The commercial value of a patent is often in the power it gives, not in the time spent on it, or its ingenuity, nor its value to the profession; and a maker, seeking to control a market or an instrument, will not look except to the valuable vantage point that he can secure by purchasing it. If one by buying a patent on an instrument can prevent competitors coming into the field, that will be the value of the patent to him. A patent, of little or no value on its merits, may thus be the key to a legal situation, and others may be ruined by a bought patent. It is interesting to notice that the same class of minds that justify patents in dentistry also justify secret preparations and the refusal to teach improvement or give information, and the formula of materials or medicine and their true or scientific nomenclature. Thus patents are only part of their offending against the standard set for a liberal profession, and thus the real object—exclusiveness—becomes apparent. Others seek to turn the question from patent right to copyright, though I have not heard them mention the book whose owners have formed a company and worked it on the "license or royalty plan." When copyright



is used like patent right, so that the consent of the author or owner must be asked before operations can be performed, and companies are formed to license, permit, or appoint those who shall have the right to act for them in certain territory, it will be the duty of those who guard education and the liberal profession to include that also, among those things that debar from membership or association.

Mr. Dixey has, I believe, the exclusive right in all America to sing "It's English, you Know," but Mr. Dixey does not call himself a member of a liberal profession, or claim to be under its obligation, nor does he ask favors of them; nor can he claim for others, as does a physician, the right of consultation by virtue of his society membership.

A defender of patents in dentistry, in writing to a medical journal, makes this humiliating confession regarding the subserviency to trade to which they have reduced dental societies: "Our dental inventions are not," he writes, "shut up like those of our medical *confrères* in one city or in one society, but are shown in practical use at all the clinics of the State societies, either by the inventor in person, or a practitioner *appointed by the dental firm* who holds the right of manufacturing."

Are the appointments of the surgeons who operate in the hospitals of your city made by firms who own and manufacture instruments? Is this right of manufacturing ever sold without *the power to threaten* or to *sue* other dentists who may be improving instruments that may infringe or compete with it? One would suppose that pecuniary interest would be enough to debar from a meeting or clinic those things in which practitioners had a financial interest. For in a meeting a member is at once judge and jury and witness; and Garretson says, in writing on expert testimony, "that the scientific man who appears in the witness box as an advocate cuckold science." And are our societies, schools, and journals less in importance? Mr. Justice Gray, of the United States Supreme Court, left the bench and did not take part in hearing "The Telephone Case" merely because a relative was a stockholder; and no lawyer can be asked to try a case before a judge or jury who would be financially interested in the result of the verdict.

In clinics all should be given as part of a scientific and professional demonstration, not as a sign-board to point the way to the shop of some exclusive maker. Clinics are best defined as "*bedside teaching*," but our neglect of professional obligations has reduced them to *bedside peddling*. I doubt if there is a dental society holding clinics to-day that is not introducing illiberal practices. The odious Tooth Crown Company gained its first introduction through them.

The dignity of the professional teacher requires that clinics shall

not be used as advertising boards for patent instruments or materials, but that all operations taught in them should be performed with free instruments, and should be as free to be followed as any operations in the hospitals of your city by the surgeons witnessing them. Better give them up than to have them used by Tooth Crown Companies, or the like, or conducted in a trade atmosphere which poisons professional life-blood, so that it will not form a healthy professional growth. On nearly every society programme I see the names of teachers in our colleges, who, by reason of their patents on the instruments to be used in the clinics, make it not unfair in us to suppose they derive a pecuniary benefit thereby; and I, Mr. President, who am a simple man, and perhaps foolish enough to think that men who desire to be classed as belonging to a liberal profession should strive to show the outward or visible signs or forms of one as evidence that they are possessed, also, of its inward or spiritual grace, have been sadly troubled whether to class these gentlemen as "college teachers" acting as depot-steerers, or "depot-steerers" acting as college teachers.

If we are to be satisfied with menial positions because they pay best, well and good. Some cooks receive a larger sum per annum than some college presidents; but I have not heard that our universities have, as yet, given up teaching the humanities to train cooks, nor that the latter are asked to grace our platforms on commencement days.

Let us be spared the mortification of knowing that any member of a body which calls itself a liberal profession, governed by moral and professional obligations, has been so false to them as to assist litigation among our instrument-makers by selling to them for money the power to destroy the men of small capital, and has stood by consenting to their commercial death. The man who can say, "I will go with makers when they pay me more than societies," prostitutes professional position. There should be no underground railroad running between the editor's chair and the shop of the maker or dealer in instruments. The editing of a journal should be done with as much understanding of The Code and what constitutes a liberal profession as any service it receives. All professional matters should be given importance, and all trade interests equal terms. No article should appear in the reading pages written in behalf of materials in which editor or publisher have pecuniary interest. They should have no connection with trade so that it would be to their interest to delay or prevent publication of the freest discussion of the requirements of practice, or any topic that the profession chooses to take up. A journal must be the outspoken mouth-piece of an outspoken profession; for to allow the advertising pages to be

controlled by any one dealer mars the professional standing of the whole journal. For a member of the profession to lend his name as editor to a journal whose publisher is likewise an instrument-maker, who refuses to admit or continue advertisements of competing makers, is to tarnish professional character and the independence of the editor as well. Let the reading pages be open to the introduction of practical matter and improvement also. Let them find a place beside the microscopist for a description and illustration of the wonderful blow-pipe of Prof. John S. Thompson, of Atlanta, Georgia, and beside the pathologist for the machine for cutting engine-burs invented by Dr. E. B. Call, of Peoria, Ill. We cannot expect them to be given equal importance in our journals if they are not conceived of by the inventors, the profession, and the society, as services due to it by reason of membership. For many of these omissions the blame rests at our own doors. Had the beautiful mechanism perfected by Dr. Perry, and known as the Weber-Perry engine, been completely described and illustrated so that any practitioner could have had one made by a competent instrument-maker, when first invented, it would have become the absolute property of the profession; and what better service can be given to-day than the invention and presentation of a dental engine that may be made by any instrument-maker, and rank as a professional surgical instrument?

From a scientific, moral, or professional stand-point, it would seem almost incredible that the editor or publisher of journals claiming to represent the profession should know of valuable instruments, and not mention them in their journals, be the owners of processes of manufacture that are not published, or should be concerned in hindering their use by others. It is disgraceful even to be suspected of hindering a professional or scientific man from obtaining anything he wishes to use in his work, that they should be concerned in suppressing competition, or give men who violate the medical code prominence in their journals. Yet the statement is freely made that processes of use to the dentist are not printed by editors or publishers of our journals, though known by them for years.

Dentistry cannot ignore the mechanical, but must clothe it with honor as the orthopedic surgeon has done, by bringing what enters into our practice under scientific and liberal control.

With the combination of instrument-makers and others called by those who compose it the "Dental Trade Association," we are concerned, as it affects our profession. It is not something we are at liberty to discuss if we wish; but if its effects are such as to keep dental requirements from the usual channels of medical and other



scientific supplies, or to hinder competent persons engaging in our service, it becomes a question that it is our duty to discuss, and one which we have no right to omit.

The evil effects of patents and secrets in the profession are manifested as well by their effect on our instrument-makers; they have become so thoroughly debauched by them that the first question seems to be always, not to supply what is needed, but to make that of which they can secure exclusive control either by secrets or patents.

The advantage gained by a patent or secret process encourages the aggregation of interest; and, having secured the power to prevent all others from making one instrument, it was but a logical step to form an organization which should secure the control of all the requirements of dental practice, and under this system those who have patents or secrets to sell will receive more consideration than those who wish to introduce professional or open articles in which there may be subsequent competition.

Some time after graduating I became interested in gutta-percha, followed it as well as I could from supply to source, and gave all I knew freely to students and societies. I received one day an application from a dealer who had been asked by dentists to procure it for them. I replied as follows,—I omit names, of course, because this is not a fight against persons, but for a principle:

"Yours of . . . is at hand. I shall be much pleased to aid you in getting a gutta-percha filling before the profession, and will teach freely all I know regarding it to any one whom you may select. I shall require in return that it be professional in every way. Its formula must be printed both on the label and circular, both to be made out as directed by me. It must then be ranked among physicians' and surgeons' supplies, and sold at a uniform wholesale rate to all druggists, dental depots, makers and dealers in dental and surgical instruments, etc. Regard for the standing of the profession, and my position as a teacher at the dental school, will not permit me to grant the use of my name except under these conditions."

Were there any conditions imposed that any physician or teacher should not require? Yet the substance of the reply I received was: "On business principles we could not accept the conditions you mentioned; it would be too much of a departure from business plans of the past for us to undertake."

It was certainly my duty to require what I did, and I presume, also, the gentlemen who wrote me felt it their duty to "The Combination" to refuse to supply the gutta-percha as a professional material.

I notice that it is claimed by a speaker in a Western meeting that

this "association is just the same as the dental society," and organized just as we are "to keep out scalawags." Now, our societies are not organized to keep out scalawags, but by the scientific and liberal associations that should cluster around them to prevent members from becoming scalawags. But the scalawag question interests me a little further; for I read under article 16, page 12, of what purports to be the "By-Laws of the Dental Trade Association:" "*In future no practicing dentist, not now a dealer, shall be eligible to membership in this association, or entitled to trade discounts.*" And I am moved to ask if, in the opinion of our Western friend of the combination, "practicing dentist" and "scalawag" are synonymous terms.

It is not strange if, for a time, our instrument-makers fail to understand the position they should take, for we have led a lax professional life, and our recognition by the American Medical Association is but recent. They will now be called upon to abandon secret or patent processes and instruments, and advance to the position of professional and scientific makers.

Our schools can do much for securing competition. It should not be in the power of the agents of any maker to say that a professional school "plays its students" into the hands of one. There is professional propriety in favoring none. There is professional disgrace in admitting but one.

The spirit of Article I, Section 4, of the medical code should be sufficient to guide us in the treatment of combination makers:

"Section IV. . . Physicians ought to use all the influence which they possess as professors in colleges of pharmacy, and by exercising their option in regard to the shops to which their prescriptions shall be sent, to discourage druggists and apothecaries from vending quack or secret medicines, or from being in any way engaged in their manufacture or sale."

It is clearly our duty under this to take heed that we encourage science by purchasing and using, as far as possible, professional requirements,—those that are free from patents and secrets open to all qualified to make, bearing in mind that the object of the code is not to fight patents and secrets in general, but to keep them out of medicine, thereby providing that it shall continue a liberal profession, and that we may not in buying our requirements aid in degrading our calling. "Millions for supplies, and not one cent in aid of quackery," will be a good motto. We should insist that all aid we give workmen by directing them in the making of our requirements be met with a guarantee that they shall afterwards be handled as medical and scientific supplies, thus recognizing that everything has an ethical as well as a useful end, and, unless guarded, may be used to degrade as well as to aid us. The laws of

health and contagion have taught us that if we will not be our brother's keeper he will be our destroyer.

It is interesting to note, in connection with the assertion that the combination has nothing to do with prices, that they have been reduced only in materials that come into competition with it and can be bought outside.

"Sell me this patent; we shall never dictate to dentists," says the Tooth Crown Company or instrument-maker. The professional man must answer, "I cannot sell you *the power to do it* even if you do not propose to." For patent does not imply use, but *power* over so much of dentistry as the invention covers, and makers often demand complete control as a condition of making; and once made property by patent, death, sale, financial embarrassment, litigation, all become agents that may remove it from the profession and give its title to others. The fact that they are property is just the worst part of it, and constitutes the danger to a liberal profession. Dr. Hale, in the address quoted at the beginning of this paper, said, "The medical profession brands with infamy the man who makes God's Truth his property." We do not want our calling to depend upon the views of others regarding their property, be they the Tooth Crown Company or combination instrument-makers. For not more surely does the wire that runs to our office bring with it the subtle power of electricity, than do patents and secrets subject our profession to all the vicissitudes of a trade.

Those who must advise their sons to follow or not the calling of their fathers may be pardoned for wishing to know if they are to advise them to take an independent calling, or one whose practice on entering they will find involved in continual litigation, and for whom every new operation may include a new terror or degrading condition which absolute ownership by others may impose; though I am free to admit that it will not interfere with the practice of those who find their highest ideal of dentistry in the polish of instruments, in the cohering of gold, in the soldering of bridge-work, or in the vulcanization of rubber, "and who daily strive through all life's space in hope to stand well in some maker's grace."

For the *raison d'être* of our profession is not to produce, secure, or use highly-polished instruments. Dentistry should rise to and rest its claims upon its scientific, physiological, and moral purposes and obligations,—the preservation and restoration of function, the relief and prevention of suffering and pain, the restoration of grace and symmetry, and the aid it gives that there may be a "sound mind in a sound body." That to do this we should be free as physicians to call to our aid the arts and sciences; they to furnish the means, we to give the special application. That our needs create and



develop instruments; they are our aids and under our control, or should be, not we to be controlled by them.

We are not trying this case of "Patent Secrets *vs.* a Liberal Profession" before a jury of machine-shops, instrument-makers or dealers, the journals they control, their employees, or those members of societies that they hold in leash. We are trying it by the liberal standard set by all liberal professions. Scientific and professional interests call for scientific and professional tests, and discussions on them are not conducted by anonymous writers or paid attorneys. No man who is willing to act in schools, societies, or journals in the pay of an instrument-maker can pick a quarrel with us on this question.

I cannot do better than to quote as a witness the honored head of our university, whose address before the American Academy of Dental Science was the first comparative study of dentistry made by so competent an authority:

"There is another common attribute of good physicians and surgeons which has had great effect to elevate and liberalize their profession. I mean their characteristic zeal for teaching. This zeal is manifested not only in giving direct instruction to medical students, but in imparting to medical societies and the public every important fact observed, every useful practice invented, and every suggestive opinion or promising theory conceived. The constant desire and purpose on the part of its members to teach, to impart to all any peculiar knowledge which each may acquire, is one of the principal distinctions between a liberal profession and a trade. Dentistry would have no claim to be called a liberal profession did not its practitioners manifest this zeal for teaching."

Those who are making this fight for the improvement of dentistry will not be turned by ridicule or misrepresentation, for we know that that can be cheaply hired in the market, but those that oppose us must show that we have misrepresented medicine or the liberal professions; when they have done that we will beg their pardon and retire from the contest.

You will all be glad, I know, to hear these words from a Nestor of our profession, Dr. W. W. H. Thackston, of Virginia:

FARMVILLE, VA., March the 9th, 1889.

HORATIO C. MERIAM, D.M.D., Salem, Mass.:

*My dear Doctor*,—Very warmly sympathizing with your efforts and labors for the betterment and true advancement of dentistry as a "liberal profession," I can only most keenly regret that my health at present forbids a trip from home, unless to visit a milder climate than even Virginia affords.

I am just recovering from a bronchial and laryngeal trouble, which demands every precaution to avert a relapse, and consequently have been obliged to decline the kind and courteous invitation of the New York Odontological Society to be their guest at the approaching meeting. I lament my inability to be personally

present at the said meeting of the Odontological Society, where I might have another opportunity of giving oral expression to sentiments, views, and convictions which I have held, and which I have earnestly sought to teach and enforce in all my private professional intercourse and public positions and relations during nearly five decades of active professional life.

For nearly fifty years I have unceasingly labored to lift American dentistry to the plane of an accepted, recognized, and acknowledged liberal profession,—a profession co-equal in character, in dignity, and general esteem and appreciation with medicine, with general surgery, with law, and with any and all the accepted and accredited departments of science. I have always and everywhere, with word and pen, in public addresses and monographs for the journals, by appeal, by argument, by fierce invective and denunciation, antagonized the irregularities and empiricism that shadowed our pretensions and stained our professional escutcheon.

I have at last the satisfaction of rejoicing in at least the partial fruition of long-deferred but constantly cherished hopes. At last I have lived to see dentistry regularly, formally, and officially adopted and admitted to the fold of *learned and liberal pursuits and callings*. At last the true professional sentiment is asserting itself in our ranks, and finding advocates and exemplars among our most distinguished representatives; and I comfort myself with the reflection that I may yet live to see the “bar sinister” wiped from our armorial ensigns.

I make no fight and have made no war against artisans, tradesmen, or others outside the liberal professions who seek or have availed themselves of patents and the protection of patent laws, to appropriate and make monopolies of their purchased wares, their inventions, and their discoveries, though it must be confessed that in many instances the exactions of such monopolies are most hideous and oppressive; but the legal and often strained moral right is clearly with them. The unprofessional man, the artisan, the inventor, the tradesman, as a rule, have not been the beneficiaries of the schools. They have not “without money and without price” freely drawn upon the accumulated stores and resources of the sciences and professions, of all the ages and all the civilized world. They have taken no “Hippocratic oath,” have pledged fealty to no code of professional ethics, and may, without discredit or dishonor, cover their product with scripts from the Patent Office, and only become culpable by an abuse of their vested monopoly.

The professional man, the physician, the general or the special surgeon, the *dentist*, who conceals or appropriates a discovery, an invention, an instrument, appliance, or an improved method, who compounds a nostrum and dispenses it for his individual profit, or who sells the same for a consideration to another with the design of its being covered by letters patent,—violates and contravenes every principle and sentiment of professional morality, every obligation held sacred by the “code,” every usage and tradition accepted, honored, and observed as the distinguishing characteristic of an elevated and liberal calling.

I will not attempt to supplement the arguments you will address to the Odontological Society of New York; and the limits of such a communication as I am now making afford no opportunity of contrasting the long line of “immortals” who have honored the profession, who have ennobled the true manhood, and who have blessed humanity with their labors and benefactions, and who have accepted the approval of their own consciences and the gratitude of their fellow-men as a full and abundant requital of their grand achievements and priceless bequests, with the selfishness and vulgar cupidity that has shamed our age, and which casts reproach upon our claims to a higher civilization. The ravening beast of prey

finds a luscious morsel; he gloats, devours, and shows his teeth and claws to his own whelps and kind. The "Tooth Crown," the "Rubber," or other patentee grips his new-found good (or *bad*) thing, and to all comers, even *his whelps* and kind, shows his patent script and demands his tribute coin. This may be sanctioned by the soulless and selfish laws of trade; but by the morals of a "*liberal profession*"—never.

To sum up, and conclude: Dentistry is either a trade, with the license of an open and unrestricted business pursuit, or it is one of the "liberal professions." If the latter (as no one will now question), it should be regulated and controlled by the laws, usages, and customs that distinguish all other "liberal professions;" and from my own apprehension of the subject it is now morally mandatory that dentists, as well as physicians and others, should respect, observe, and conform to those laws, regulations, and usages. As I have said, and now repeat and emphasize, I make no war or fight against inventors, artisans, tradesmen, and merchants; but the professional member of what is recognized as a "learned and liberal calling," who appropriates and patents a discovery, invention, an appliance or remedy, or who sells the same to another to be patented and made a monopoly, not only compromises himself, but inflicts a grievous wrong upon society as well as the profession which he has solemnly covenanted to honor, protect, enhance, and improve.

With highest appreciation of your efforts and labors in behalf of dentistry as a "liberal profession," and with every wish for the success of the meeting of the Odontological Society of New York,

I have the honor to be, very truly,

Your obedient servant,

W. W. H. THACKSTON.

That all may be clear, I have written to some whose words must carry more weight than mine, and I will read you my letters and the replies received.

My first is from the president of the Congress of American Physicians and Surgeons, president of the Massachusetts Medical Society, professor of surgery in Harvard University, and surgeon to the City Hospital in Boston, to whom I addressed the following letter:

257 ESSEX ST., SALEM, MASS., Feb. 6, 1889.

DR. DAVID W. CHEEVER, Harvard Medical School, Boston, Mass.:

*Dear Sir*,—I am preparing an address for the New York Odontological Society on "Professional Atmosphere and Morals," to be delivered in March next, and shall be much pleased if you will give me for use in it your opinion—as dentistry claims to be a specialty of medicine—on the propriety of its members holding patents on the requirements of its practice, instruments, etc., or being interested in proprietary trade-mark or secret materials or medicines, or encouraging their use, manufacture, or sale. Can its members with due regard for professional independence, honor, and morality, hold positions as teachers in dental schools or colleges, or appear as such at societies or clinics, performing operations or using instruments on which they receive payment, royalty, or commission from makers or companies controlling them? Will the tendency of these things be to create or destroy a liberal profession, and will they, if existing, prevent dentistry advancing to the position of one?



A number of gentlemen wish to bring this matter before those interested in professional questions and the improvement of dentistry. Any help that you can give us will be of value to the profession and aid of us.

Very truly yours, HORATIO C. MERIAM.

The following is his reply,—dividing the letter into three questions :

238 BOYLSTON ST., BOSTON, Feb. 9, 1889.

HORATIO C. MERIAM, D.M.D., Salem, Mass. :

*My dear Doctor*,—In reply to your three inquiries in your letter of Feb. 6, I would answer, decidedly :

To the first question, No. To the second question, No. To the third question, Destroy and prevent.

I am very positive that such things would not be tolerated in the medical profession.

Very truly yours, DAVID W. CHEEVER.

A similar letter to one whose name is not unknown to you was replied to as follows :

(Dictated.)

BOSTON, Feb. 8, 1889.

DEAR DR. MERIAM,—It is for the dental profession to settle its own status. Its work is so largely mechanical that it necessarily tempts inventors to seek fortunes through improvements in dental instruments. The more exactly they exclude owners of money-making contrivances who patent their inventions, the better will be their claim to be considered a liberal profession.

Yours very truly, O. W. HOLMES.

From the dean of Harvard Medical School and its professor of physiology was received the following reply :

JAMAICA PLAIN, Feb. 18, 1889.

DEAR DR. MERIAM,—I have received your letter of Feb. 6 asking my opinion on the probable effects upon the dental profession of its members becoming pecuniarily interested in patent processes and materials used in the practice of their art. As a reason for addressing me on this subject you say that "Dentistry claims to be a specialty in medicine."

It seems to me that were this claim generally made and allowed there would be no occasion for discussing the above question, for it would then never occur to a dentist to patent a process for filling a tooth, any more than to a surgeon to patent a method of operating on hernia. It is precisely because so many dentists look upon their business as a trade rather than as a profession that trade methods find so easy application in dentistry. With this tradesman's view it is difficult to find fault. No moral reason can be given why a dentist, if he desires to do so, should not reap the reward of his skill and ingenuity in the same way that is permitted to an engineer or a mechanic. It is only when viewed from the standpoint of a member of a liberal profession that such conduct appears objectionable, for the chief distinction between professional men and traders is that the former are animated by an *esprit de corps*, and work largely for the good of the community, while the latter have, as a rule, no such motive, and work chiefly for their own individual benefit.

It is evident, therefore, that there can be no greater obstacle to the recognition

of dentistry as a liberal profession than the interest of the practitioner in secret materials and patent methods. Hence it is clearly the duty of those who desire to see dentistry assume a position as a specialty of medicine to discourage such practices in every possible way. There need be no quarrel with those who see fit to patent their inventions or to hold patent rights, but it should be distinctly understood that in so doing they are working on lines inconsistent with professional standards. When the lines are thus clearly drawn, the strength of the claim which dentistry may make to be regarded as a liberal profession will be apparent.

You also raise a second and quite a different question, whether a dentist may "properly encourage the use, manufacture, or sale of secret materials or medicines." Here it seems to be more difficult to lay down a general rule, for it may happen that a patented method of filling may be better adapted than any other to a particular case, and the dentist's duty to his patient would then require him to use it, in the same way that a surgeon would not hesitate to use a patent drill if he found it better suited than any other tool for performing a special operation. On the other hand, the general use of patented methods and materials would subject dentists to an intolerable supervision of their practice. Cases of the sort will, however, be of much less frequent occurrence when dentistry takes its place as a specialty of medicine.

With best wishes for your success in agitating this important subject,

Yours very truly, H. P. BOWDITCH.

The dean of the medical school expressed himself more strongly than in his letter, at the recent meeting in celebration of the twentieth anniversary of the dental school, saying that he would use patent instruments that aided him, as he would use a telephone that helped him in teaching physiology, but of course no professional man would be pecuniarily interested in patents on instruments of his profession.

I wrote our hospital in Boston to know if the clinics there are ever used for the purpose of introducing patent instruments, medicines, or operations, secret or proprietary articles, or if instruments are used there on which the surgeons receive a royalty or commission from makers owning patents and controlling them, and if such makers are allowed to influence the appointment of operators at clinics. Are members of the staff obliged to ask permission of each other for liberty to improve instruments, and can makers interfere or prevent their doing so?

This is the reply:

MASSACHUSETTS GENERAL HOSPITAL,  
BOSTON, March 11, 1889.

DEAR DR. MERIAM,—The hospital clinics are not used to introduce medicines or instruments. No royalties are received by our surgeons. Members of the staff are not obliged to ask permission to improve instruments.

Yours very truly, .

JOHN W. PRATT, Resident Physician.

And lastly I read, because received last, this from Dr. Barrett:

BUFFALO, N. Y., March 14, 1889.

DEAR DR. MERIAM,—I very much regret that it will be absolutely impossible for me to be present at the meeting of the New York Odontological Society on the 19th inst., and to listen to your paper upon "Professional Atmosphere and Morals," for I know it will be an occasion of interest to every one who loves his calling. No dentist can be indifferent to the subject, and it is one upon which I have bestowed much thought. Are we a profession or are we not? If we are or desire to be, our conduct must be regulated by professional methods. If we are a mere trade, the question of professional ethics does not concern us, for there is among intelligent men a distinct line drawn between the methods of conducting a profession and those which are proper to trade. The former has to dispose of the products of his brain, while the latter sells the work of his or another's hands. While both are in one sense alike honorable, the world is accustomed to value the result of mental effort above that of the muscles, and people in trade are permitted a license in disposing of their wares that is denied the professional man. The former offers an article that has a definite commercial value, while the labors of the latter depend wholly upon his professional ability, knowledge, and experience. It can only be measured by methods peculiar to itself, and the honest disposal of mental effort demands a code of its own, entirely distinct from that which governs commercial pursuits. If a man sells a manufactured article of inferior character he is easily detected, and it is possible to make him amenable to a written law. But with the product of men's brains no such exact determination can be made, and therefore each profession is held accountable to an unwritten law, which it is the bounden duty of that profession to enforce.

Among those laws which are common to all the professions is that which prohibits advertising, and all the usual business methods of trade. There must be a line of demarcation drawn somewhere, and it is at this point. The business methods of trade must not be followed if one would have a position in a profession.

It is impossible to formulate a complete code for the regulation of the conduct of a professional man, because professional conduct must be prompted by an innate professional spirit, and what under one condition might be proper, under different circumstances becomes entirely unprofessional.

The fact that dentistry as practiced to-day comprises so much of mere handicraft and manual labor, makes it difficult always to determine what is true professional conduct with us, but this we must accept if we would be classed with professional men: whatever is peculiar to trade must be eliminated. We must cease to be mere manufacturers, ready to seize upon any pretext to obtain or to control patronage; we must frown upon all attempts to monopolize methods and deprive our brother-practitioners of needed facilities and knowledge; we must forsake the methods and ethics of trade, or we must drop to its level. We cannot be professional men and tradesmen at the same time. We must belong to either one class or the other. The other professions cannot and will not, without self-destruction, acknowledge a branch which is not actuated by pure professional instincts and feeling, and which does not sedulously strive to maintain a high professional standing.

Hoping that the coming meeting will serve to make more plain the line between professional and unprofessional conduct,

I am most truly yours,

W. C. BARRETT.

Mr. President, I have heard it urged as a reason for the study of medicine that it offered full opportunity for the free development of



all the qualities of the heart, hand, and brain, thus affording an atmosphere that would produce the highest style of man. And here let me quote these words on the purpose of a nation: "For in our modern thought the nation is the making place of man. Not by the traditions of its history, nor by the splendor of its corporate achievements, nor by the abstract excellencies of its constitution, but by its fitness to make men, to beget and educate human character, to contribute to the complete humanity, the perfect man that is to be, by this alone each nation must be judged to-day. . . ." "Show us your man, land cries to land."

As of a nation, so also of a profession. Not by our degrees and titles, nor recognition by medical gentlemen or medical associations, nor by education, and a special advance in any one field, alone, but by bringing our whole profession into the atmosphere that forms and maintains liberal professions of whatever name, so that we too can show our man. "For the real value" [of a profession like] "a country, must be measured in scales more delicate than the balance of trade. . . ." "On a map of the world you can cover Judea with your thumb, Athens with a finger-tip, and neither of them figures in the 'Price Current,' but they still lord it in the thought and action of every civilized man."

No profession, however useful, can be great or held in honor that does not produce manhood.

Let us be thankful that as we take our way with the Rubber Company of odious memory behind, with the threatenings of the Tooth Crown Company before us, with patented instruments and operations and proprietary materials and "The Combination" on either side, with Judas forever in our midst, that dentistry can answer when called with the name of Barnum, and I would that every dental school in the country had a tablet to his memory.

The minds of us all rise at times above the question of the polish of instruments or the number of square miles covered by showcases, to consider in what form we shall leave our profession to those who come after us.

The Chinese potter, as he molds the clay prepared for him by his father, neglects not in intervals of his toil to prepare other for the son that is to follow him. Let us so mold what is to be the profession of the future, by daily guarding the practice of our profession, that no future Templar landing on our shore shall find the dentist working with a collar soldered about his neck, although of beautiful workmanship and nickel-plated, bearing on it the inscription, "Wamba, the son of Witless, is the thrall of Cedric of Rotherwood."

## ANTIPIRETTICS, ANTINEURALGICS, AND ANALGESICS.

BY EUGENE L. CLIFFORD, D.D.S., CHICAGO, ILL.

(Read before the Chicago Dental Club, March 25, 1889.)

MR. PRESIDENT AND GENTLEMEN: I have been asked by members of our club to collect and formulate from my readings and office experience some thoughts upon several of the more modern remedial agents. Those to which I will call your attention are classed in general therapeutics as antipyretics, antineuralgics, and analgesics. Those of you who have kept abreast of the current literature of medicine, dentistry, and pharmacy have no doubt noticed the great number of new remedies recently brought out. Of the first of these remedies, antipyrine, as far back as February, 1888, the statement was editorially made in the *Dental Review* that antipyrine deserved to be added to the dental pharmacopœia. Experience since, by experimenters of note, tends to confirm this statement; although experience has also shown that the further statement made in the same article (that its administration is not followed by any unpleasant after-effects) must be received with caution.

A brief review of the history of this drug will lead to a more intelligent understanding of its importance. Antipyrine is an alkaloidal product of the destructive distillation of coal-tar. It may also be prepared synthetically. It has the chemical formula  $C_{11}H_{12}N_2O$ , and the chemical name di-methyl-oxy-chinicine, being derived from the hypothetical base chinicine (or quinizine), which itself is a derivative of chinoline.\* The drug is also known to the trade as methozin, a term adopted by the *Western Druggist*, of this city, with the idea that a name should imply, in some degree at least, its derivation or constituents. The name methozin is also urged upon the profession, for the reason that "antipyrine" is copyrighted for trade purposes and therefore should be dropped from professional usage. The alkaloid was introduced by Dr. Knorr, of Munich, and occurs as a whitish crystalline powder which combines with acids to form salts; is somewhat bitter, and soluble in half its weight of hot water and in its own weight of cold water. It is less soluble in alcohol, chloroform, or ether. It gives an intensely red color with ferric chloride, and a beautiful green with nitric acid. It is not irritant to either the stomach or the tissues, and may be administered hypodermically. The maximum dose for an adult is thirty grains hourly for three hours, or

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\* Prof. S. P. Sadtler, in a recent article published in the *Journal of the Franklin Institute*, gives the chemical name and formula of antipyrine as follows: Phenyl-dimethyl-pyrazolon ( $C_6H_5$ ) ( $CH_3$ )<sub>2</sub>C<sub>3</sub>HN<sub>2</sub>O.

ninety grains in twenty-four hours. For children, one grain for each year of age, for three successive doses. If vomiting result, the same dose may be dissolved in half its weight of hot water, and injected hypodermically while warm. Antipyrine has but little flavor, is not unpleasant, and is therefore readily taken by children. It may be administered in tablets or in solution. A good combination is eighty grains of antipyrine to four fluidounces of elixir aurantii. Each teaspoonful contains two and a half grains. Hypodermically, seven and one-half grains dissolved in water is an average dose, though double that amount is often given.

*Physiological Action.*—Powerfully antipyretic, local anesthetic, and a general analgesic. It also possesses diaphoretic, mydriatic, antiseptic, disinfectant, hemostatic, and slightly hypnotic properties. After the ingestion of a full dose (gr. xxx) there is a stimulant stage, of short duration, in which the heart's action is increased, and a subjective sense of heat is experienced, with flushing of the face. This is soon followed by profuse sweating, coldness of the surface, slowed pulse, and considerable depression, and, if fever be present, by lowered temperature, the latter coming on within half an hour after taking the drug, and its degree, as also its continuance, being in direct ratio to the quantity administered.

In health its administration gives rise to slight nausea, singing in the ears, and a slight reduction in the bodily temperature. It slightly raises the arterial tension, sometimes induces vomiting, causes a peculiar eruption of the skin, and very rarely such a degree of depression as to amount to collapse. It has no effect upon the respiration, but acts as a sedative upon the cerebrum, leaving behind a somewhat depressant influence upon the brain. It is eliminated by the kidneys, appearing in the urine about three hours after ingestion. In toxic doses its principal influence is exerted upon the blood, altering the shape of the red blood-corpuscles, separating the hematin, and causing decomposition of that fluid. As an antipyretic it acts like alcohol, by a double mode of operation,—first, by diminishing oxidation; second, by causing loss of heat by dilating the cutaneous vessels, allowing free radiation from the surface, and by the refrigerant action of the evaporation of the sweat.

As an analgesic, antipyrine has a very considerable degree of power, and it is this which increases its interest to us as dentists. It was thought at one time that its analgesic effects were almost entirely limited to the rheumatic diathesis. Experience, however, has shown that it is not confined to that condition. It gives great relief in cases of trauma, also in cases of acute pericemental irritation. In reflex neuroses of dental origin it is a prompt and powerful remedy. In all cases of hyperpyrexia, in all cases of neuritis of rheumatic



origin, whether from cerebral or spinal centers, in almost all neuralgias and neuritic troubles, in all painful affections of hysterical persons, in pain from cerebral tumors or cardiac diseases, dysmenorrhea, etc., prompt relief follows its proper administration.

Prof. Sée considers that the hypodermic use of antipyrine is as effective as that of morphine, without the unpleasant after-effects of that drug. It does not interfere with nutrition nor lead to a craving. Berdach has lately been experimenting with the drug at Vienna. He uses a fifty-per-cent. solution in distilled water, and has had none but favorable results. All kinds of painful conditions were so treated, the injection being made at the most painful spot. For a few seconds after injection there is local pain and burning, but this soon passes off, and is followed by analgesia over an area of more than a centimeter around the point of injection. The pain is usually relieved in a few seconds; the effects last about six hours, and there are no disagreeable sequelæ such as vomiting, etc.

Of its application to dentistry and its uses, Dr. Hugenschmidt, of Paris, writes to the *Dental Review* (July 15, 1888). He says, "Among the numerous painful affections which the physicians and dental surgeons have to treat, one of the most common is certainly acute dental periostitis." After trying all the numerous remedies recommended, he hoped, when cocaïne was brought to the notice of the profession, to find in it a remedy for this trouble. He was soon disappointed, finding that it was of scarcely any use in inflammatory conditions, sometimes even increasing the pain. In September, 1887, he began the use of antipyrine in many painful dental affections of a neuralgic character, with excellent results. His favorite prescription seems to be a one-hundred-per-cent. solution, fifteen minims for a dose. In order to relieve the pain of the antipyrine injection, Prof. Sée advised the addition of cocaïne to the prescription. Dr. Hugenschmidt found no difference when the cocaïne was added to the injection, but a great difference if the cocaïne were injected alone five minutes before the antipyrine. These injections should always be made under the most careful antiseptic precautions. An induration and swelling surrounding the point of injection will be found upon the following day, indicating a local cellulitis, but sloughing or other untoward symptoms have not been noticed. The doctor often combines the hypodermic with the internal administrations, and summarizes in the following terms: "The combination of the hypodermic injection of the drug with the internal administration of fifteen grains of antipyrine half an hour after the injection—this same dose to be repeated at bedtime if the trouble shows any tendency to return—will certainly afford relief to any suffering patient, and, if the drug is pure, no general symptoms at all are to be expected or feared."

Experiments have also been made, with favorable results, in the direct application of antipyrine, in saturated solution, in acute pulpitis, as also in combining equal parts of antipyrine and arsenious acid for the destruction of the pulp; but the number of cases of the latter, however, has not been sufficient to permit an absolute opinion of its value.

Writing upon the subject of cocaine toxemia in the same journal (August, 1888), Dr. Ottolengui remarks as follows: "It is a *grand* drug, but already the medical fraternity are calling a halt and using it more carefully. *Don't inject it.* Fifteen grains given internally is preferable from the stand-point of safety, and will serve with sufficient efficacy—I am speaking from personal observation. I have used it without a failure, though only a few times, for pericementitis, and once with marked success, as follows: Lady presented with aching tooth; pulp almost exposed, but no actual lesion discovered; capped and filled the tooth with oxyphosphate. Next day tooth quite tender, though not elongated, and aching. Fifteen grains of antipyrine in half-ounce of water produced sleep in twenty minutes, and the tooth has not ached since, two weeks later. Nevertheless, I have ceased using antipyrine, and substituting antifebrin, which I am assured by physicians is safer and as potent." These, gentlemen, are arbitrary statements, without scientific reasons for the same. If antipyrine is detrimental to the human organism, there must be some reason for it. If acetanilide is safer, and therefore preferable to antipyrine, there must be some reason for it. If Dr. Ottolengui would give the therapeutics of the two drugs, and from that stand-point argue the pro and con of each, he might succeed in convincing us of the fact. I believe that reasons do exist why in certain cases one agent should have precedence over the other, and will make an effort to explain these reasons before concluding. We should understand, first, the pathological condition existing, and, second, the therapeutic effect of the remedy administered. If the exhibition of certain medicaments is followed by favorable results, why is it so, and what has been the change produced? If a medicament possess toxic properties, what are they and how do they act?

In answer to Dr. Ottolengui, Dr. Hugenschmidt replies in the *Review* for November, 1888, admitting, as I think we all will, a preference for the internal administration of any medicament; but he states that fifteen grains given hypodermically has been followed by satisfactory results after sixty grains internally had failed.

The name acetanilide, a synonym for antifebrin, has been adopted by the profession for the same reasons given for the adoption of methozin for antipyrine. Like the larger number of the new antipyretics,

which are related either to chinoline or to phenol, acetanilide is a derivative of anilin, from which it is obtained by the action thereon of glacial acetic acid, substituting the organic radical acetylene for an atom of hydrogen. Chemically it has the name of acetanilide or phenyl-acetamide, and the formula  $C_6H_5C_2H_3ONH$ . It is a pure white crystalline powder, of neutral reaction, odorless, but of slightly burning taste, soluble in alcohol, wine, etc., but very sparingly in water. The dose ranges from two to fifteen grains, repeated twice, but not exceeding thirty grains in twenty-four hours. As much as one drachm has been swallowed without ill effects supervening. It may be administered either in tablet, in powders, or in dilute alcoholic solutions. A convenient prescription is—

R—Acetanilide,  $\mathfrak{z}$  i;  
 Sp. vini gallici,  $\mathfrak{z}$  ivss;  
 Syr. simp.,  
 Aquæ,  $\bar{a}\bar{a}$   $\mathfrak{z}$  vi.

A tablespoonful containing five grains, a fair adult dose.

Another:

R—Acetanilide,  $\mathfrak{z}$  ii;  
 Alcohol,  $\mathfrak{z}$  ii;  
 Glycerin.,  
 Syr. simp.,  $\bar{a}\bar{a}$   $\mathfrak{z}$  iii;  
 Aq. cinnam.,  $\mathfrak{z}$  i. M.

*Sig.*—One-half to two teaspoonfuls every two to four hours according to age or necessity (each teaspoonful containing two and one-half grains).

*Physiological Action.*—Acetanilide is a very efficient antipyretic, strongly analgesic and antispasmodic; lessens the reflex action of the spinal cord, and inhibits the sensibility of the sensory nerves. It raises the arterial tension somewhat, and slows the heart in a corresponding degree. A toxic dose destroys the oxygenizing functions of the blood, forming methyl-hæmoglobin. The heart, liver, and kidneys are found in a state of acute fatty degeneration in animals poisoned with it.

Compared with the action of antipyrine, the effect of acetanilide upon the body temperature is manifested more slowly, but lasts a longer time. Acetanilide also differs from antipyrine in being a cerebral, muscular, vaso-motor stimulant, and a marked diuretic, while antipyrine is powerfully diaphoretic, a cerebral sedative, and produces great depression. Acetanilide acts with but one-fourth the dose, but its action, like the latter, begets tolerance of its action. There is neither vomiting nor diarrhea after its exhibition, but there is a tendency in some few cases to collapse, with chills and cyanosis, especially the latter. The facts, history, chemistry, and physiological actions of these remedies I have taken from Potter's "*Materia Medica*." The action of the drug as thus set forth is to be under-



stood as referring to its administration to patients suffering from some pathological condition, usually some febrile disorder, while in our specialty it is administered, if at all, to patients in the enjoyment of health, but suffering from pain.

As to the advantages and disadvantages of each drug, a differentiation as to their physiological action, and the indications and contraindications, the following comparison I think will be of some assistance:

<i>Antipyrine.</i>	<i>Acetanilide.</i>
Large dose.	Small dose.
Quite bitter.	Nearly tasteless.
Soluble in water.	Insoluble in water.
At first stimulant, afterwards depressant.	Cerebral, muscular, and vaso-motor stimulant.
Nausea, vomiting, and diarrhea.	No nausea, vomiting, or diarrhea.
Skin manifestations.	No skin manifestation.
No effect on respiration.	No effect on respiration.
No cyanosis.	Tendency to chills and cyanosis.
Local anesthetic; hemostatic.	Pernicious influence on the blood, anemia following a continued use.
Little or no effect on the normal temperature.	Little or no effect on the normal temperature.
Analgesic.	Strongly analgesic and antispasmodic.

I have thus attempted to bring to notice the most prominent features of both medicaments. A timely warning seems to be to *prescribe carefully* until any idiosyncrasies have been noted. Dr. Hardy, professor of clinical medicine in the Paris faculty, reported a case to whom he had given fifteen grains only of acetanilide, in divided doses, every twenty-four hours, for only a few days. He was suddenly called one afternoon to his patient; when he arrived he found her dead, in a cyanotic condition, having presented a train of unusual symptoms. The conditions noted would certainly tend to show an obstructed circulation, an interference with the proper oxygenation of the blood, some possible cardiac pathological condition, but above all to impress upon us the *fact* that such a medicament is to be handled with caution. Accidents, it is true, will happen to the most scientific, but let us always keep in mind that, should fate bring one to our door, we should be prepared to show ordinary skill and ordinary care. A cyanotic condition is never produced by antipyrine. The reliability and purity of the drug should always be assured. The same medicament purchased from two different druggists and used upon the same patient have produced materially different effects, and may account for the variable reports received from different practitioners.

Neither of these drugs should be administered conjointly or alternately with opium, sweet spirits of nitre, or belladonna, the chemical antagonisms and changes resulting being the opposite of what would be desired, and in some cases dangerous. Four-grain doses of acetanilide repeated every hour till three doses have been taken, the patient keeping the recumbent position, are said to subdue nervous or sick headache. As to the mode of action of these medicaments when administered, as in our specialty, usually to patients in health and to overcome reflex or disseminate neuroses, a satisfactory explanation is found in the statement of Dr. Dorset, of Virginia, who found that in their exhibition retrograde metamorphosis is retarded, if not entirely suspended for the time. This statement applies also to this entire class of remedies.

Meanwhile a new visitor appears at our threshold, and promises greater results than either of these remedies. Its claims are:

1. That it is an efficient antipyretic.
2. That it does not develop any disagreeable or noxious after-effects.
3. That small doses suffice.
4. That it is perfectly tasteless.
5. That on account of its innocuousness and tastelessness, it is valuable for both adults and children.
6. That it is a powerful antineuralgic, its effects being more energetic than antipyrine, and that it does not cause lassitude or other disagreeable symptoms.

The new remedy is introduced by the name phenacetine; chemically para-acet-phenitidine, with a formula almost too complicated to mention:



Very slightly soluble in water, a little more so in glycerin, but most freely in alcohol. Phenacetine was first manufactured by Farbenfabriken (formerly Bayer & Co.), of Elberfeld, but attention was first directed to it by Prof. Kast and Dr. O. Hinsberg in February, 1887. Since then experiments have proven it to be most reliable, comparing favorably with all other antineuralgics without any of their deleterious effects.

Experiments with this drug have been conducted by eminent German, English, American, and French physicians, and all agree as to its power and innocuousness. No nausea, no vomiting, no diarrhea, no collapse, no cyanosis, no depressing after-effects follow its use. In fact, I have failed so far to find but one condition in which its administration was thought to be ineffective, and that so far is supposititious. That condition is a deficiency in the quantity of lactic acid in the stomach. Phenacetine is thought to produce its slow

but sure effects by slowly dissolving in the lactic acid of the stomach ; consequently, in those cases, which are few, where the results are negative, the investigators are disposed to believe it is for the want of a sufficient quantity of this acid to dissolve it. As an antineuralgic the happy results arrived at by Hoppe, Hensner, and Dujardin-Beaumetz with the administration of phenacetine in hemicrania and other forms of neuralgia, induced Prof. Rumpf to try it in a great number of cases. In experimenting with the drug for these purposes he was also surprised at its beneficial effects in cases of neurasthenia, with a feeling of pressure in the head. Prof. Rumpf summarizes his experiments as follows: Phenacetine is not a narcotic, but an antineuralgic aside from its strong antipyretic action. The mode of action is probably a direct influence on the central nervous system, that of the vaso-motor nerves more especially, for phenacetine acts especially on vaso-motor neuroses, which fact, with its diaphoretic powers, indicates principally a powerful effect on the circulatory system. He concludes with the statement that phenacetine is of reliable action, and produces certain effects, free from all untoward and disagreeable symptoms. As an antineuralgic the dose ranges from eight to twenty-two and a half grains (one-half to one and one-half grams), about one gram (fifteen grains) being an average dose, and is indicated in vaso-motor neuroses, in the lancinating pains of locomotor ataxia, and in the various forms of neuralgia. Prof. Dujardin-Beaumetz summarizes, after experimenting, as follows: Phenacetine is a strong analgesic, more powerful in its action than perhaps either antipyrine or antifebrin, and it acts very rapidly in spite of its insolubility in the gastric juice. About twenty minutes after its administration its effects may already be observed. It does not produce cyanosis like antifebrin, and, in contradistinction to the latter, its presence in the urine may be detected, ferrie chloride giving a red and cupric sulphate a green color to urine containing phenacetine. Dr. Kobler, Prof. von Bamberger's assistant, states that phenacetine has a great advantage over antifebrin, being far more innocuous.

I am using these several agents in my practice, giving a decided preference to phenacetine, unless contraindicated. It is a remedy so far without an objectionable feature, and with almost positive effect, giving relief in ninety-five per cent. of cases in which it is exhibited.

Another remedy has appeared called pyrodine,—chemically acetyl-phenyl-hydrozin,—a more powerful agent than any of its predecessors, but also attended with some danger. Caution is necessary in the use of this new drug; it should never be administered except in the most critical cases, and after other remedies have failed.



### COMPULSORY ERUPTION OF THE TEETH. III.

BY EUGENE S. TALBOT, M.D., D.D.S., CHICAGO, ILL.

OCCASIONALLY, by reason of their tardy eruption, the second bicuspids, and also, but much less frequently, the second molars become locked in between the adjoining teeth and are thereby suppressed. When this has occurred, the grinding-surfaces usually are visible on a level with the gums, and of course operative occlusion with the teeth which should properly antagonize the suppressed teeth is impossible.

FIG. 5.

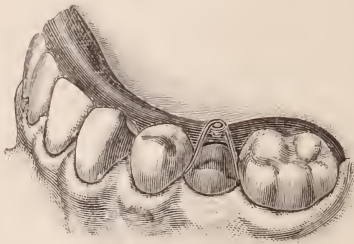
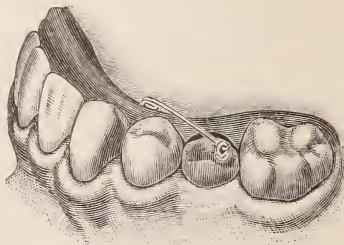


Fig. 5 is an illustration of the left side of the lower denture of a boy thirteen years old, and shows so much of the denture as is requisite for the purposes of this brief article. The second deciduous molar had been retained in the jaw beyond the natural period, and its mesial and distal surfaces had been so destroyed by caries that the first permanent molar had come forward and greatly

FIG. 6.



diminished its normal distance from the first bicuspid. The removal of the deciduous molar left an insufficient space for the accommodation of the coming second bicuspid, which consequently became locked between the molar and first bicuspid so that complete eruption was impossible.

A narrow vulcanite plate was made, and a coiled wire spring made and applied as shown in Fig. 5 to force the teeth apart. When

sufficient room had been gained, a cavity was formed in the crown of the second bicuspid, and a small wire eye-bolt set in the cavity with amalgam. Another coiled wire spring was fixed in the plate and the spring lever inserted in the eye of the bolt as shown in Fig. 6. The lifting action of the spring soon compelled the eruption of the bicuspid into its proper position and relations with the occluding teeth.

The removal of the eye-bolt after cutting away the amalgam with a small round bur, and the subsequent filling of the small cavity with gold, completed the operation.

Obviously a ligature could have been forced down upon the submerged crown of the bicuspid, and the loop hitch of the ligature be made a substitute for the eye-bolt; but this was preferred as a more positive means of attachment to the lifting spring lever.

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## PROCEEDINGS OF DENTAL SOCIETIES.

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### NEW YORK ODONTOLOGICAL SOCIETY.

THE New York Odontological Society held its regular meeting in the parlors of the New York Academy of Medicine, No. 12 West Thirty-first street, on Tuesday evening, March 19, 1889.

The president, Dr. J. Morgan Howe, in the chair.

The President. Gentlemen, the order of Incidents of Office Practice will be passed this evening, but Dr. Francis has a matter of interest and curiosity which he will present to the society, after which I will have the pleasure of introducing the essayist of the evening.

Dr. C. E. Francis. Mr. President, in overhauling the contents of a closet a few days ago I discovered the small jar which I hold in my hand. It contains all the ballots cast by the original members of this society on the evening of its organization. In it are the names of all the first officers, also the names of all the members present on that occasion. The ballots were gathered together at the close of the meeting, placed in the jar, and the jar sealed. This was twenty-two years ago, and the jar has not been opened since that time, yet many of the names are visible through the glass. It seemed fitting that I should bring it here and place it in charge of our curator.\*

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\*[The meeting referred to took place at the house of Dr. C. E. Francis in 1867, in response to invitations sent to a few professional friends to meet with him for the purpose of considering the feasibility of organizing a new dental society. Dr. W. B. Hurd, of Brooklyn, was requested to call the meeting to order. After discussing the matter freely, it was resolved that the society be at once organized,

Dr. C. D. Cook. Mr. President, I move that the thanks of the society be expressed to Dr. Francis for his donation, which is very interesting and of great value.

The motion was carried.

The President. Gentlemen, I have the pleasure of introducing to you Dr. Meriam, of Harvard University, who will address us upon the subject of "Professional Atmosphere and Morals; or, Patents and Secrets *versus* a Liberal Profession."\*

The President. Gentlemen, you have heard Dr. Meriam's address; the subject is before you. It is unnecessary for me to characterize it, for I see by your reception of the paper that you think well of it, and I leave it in your hands for discussion.

Dr. W. H. Dwinelle. It may be arrogance on my part to say that if there is one person in the room who indorses the excellent and comprehensive essay that has been read to us to-night more than any other, I believe I am that man. This subject has been nearer to my heart all through my professional career than any other. It was fifty years ago last month that I began my professional life, and when I set out upon my career in our calling I resolved—for those were the days of quackery and empiricism—that I would do what I could to elevate my profession. I knew that to indorse a system of patents and empiricism at large was to degrade any profession, and so I set out in opposition to such, and with the declaration that as we had freely received from the past, so freely should we give; that it would be illiberal and mean, certainly unprofessional, for us to receive the great contributions from all who had gone before and yet be unwilling in our little life to contribute what we might towards paying that debt of gratitude. I have been opposed in this measure by some of my best friends, who did not see the thing in the same light; but I feel that one of my hours of triumph has come to-night. I can say with truth that it has ever been my effort to dignify and elevate my profession, and bring it up to the status with our sister profession of medicine and other professions of a liberal nature. So to-night it is particularly pleasant to me to have our society indorse the speaker so thoroughly and enthusiastically, for I feel that I also am being indorsed. It may be

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and an election of officers followed. Dr. Francis was elected president, and Dr. Hurd vice-president. Other officers and an executive committee were also elected, and committees appointed to draft a constitution and by-laws, also to have the society incorporated. The society accepted the suggestion of Dr. Francis that it should be known as "The New York Odontological Society." Its motto, "Semper urgens altior," was suggested by Dr. Wm. Carr, who was also one of its founders.—ED.]

\* Dr. Meriam's paper will be found at page 413 of this number.—ED. DENTAL COSMOS.



said, perhaps, that patents in our profession are never justifiable. I started out with that general idea and principle, and have endeavored to carry it out, and thus far have done so. We are, however, so interwoven with the spirit of greed and gain, and so bound by trades associations, that in many respects we are not free men. I do not like to say it, but it is a fact, and it is to our shame. I hope this meeting will be one of the first movements by which we may recover our manhood and dignity, and bring our profession up to the high plane on which it should stand.

With reference to patents my views have been somewhat modified of late. I think that patents may properly be taken by an inventor for the purpose only of preventing the privilege of using the invention being taken away from the profession. I have been so outraged personally by the patent system that I have sometimes regretted that I did not take out patents for my own protection and for the protection of the profession. The patent system has become so intricate that a man cannot use his own invention, sometimes, unless he takes out a patent for it. I have made some inventions which were deemed important, but thieves have endeavored to rob me of them, and many methods and devices of value which it was supposed had been given freely to the profession by their originators have been stolen by those who have had them patented and then endeavored to blackmail us for the privilege of using them. We have supplied these fellows with the money and tools to cut our own throats. In the Good-year patents we supplied the material that was used to fight and defeat us, and it is now the same with the Tooth Crown Company. Of course, if we were obliged to take out a patent in every instance it would be oppressive, and I have no doubt the remedy would come in the way that has been suggested. Let us therefore frown upon the patent system, let us emancipate ourselves and be free, breaking through this wall that has been built up around about us. We are strong enough now and we can be wholly free if we will, and I trust the day is not far distant when we shall be so.

Dr. E. A. Bogue. I have been waiting to hear from some more learned and honored members their views upon what Dr. Meriam has presented this evening. I know it is in their hearts, and I am surprised that some one of more power than I have has not risen between Dr. Dwinelle and myself.

Dr. Meriam has preached to us this evening a most admirable sermon. He not only takes high professional ground, but he clearly demonstrates a deep, as well as high and broad, Christian doctrine,—“Whatsoever a man soweth, that shall he also reap.” With the liberality that he measures to others, so it shall be measured to him,—pressed down, shaken together, and running over. It is but a little

time since we have risen to a point as a profession where we had strength enough to have men write, and read before a society like this, a paper of the character of the one which we have just heard. Now, owing largely to the efforts of some gentlemen who are present, we are able before this Odontological Society to say what has been said, and to indorse it quite as freely as it would be indorsed at Harvard University. I wish to publicly express the honor I feel for Dr. Meriam (who, by the way, is one of my old pupils) because of the courage he has shown, not only in enunciating the doctrines which he so acceptably put in his paper this evening, but for giving to the profession the work that he presented a year ago in Boston, in his effort to emancipate us from the thralldom of trade secrets. I have not had opportunity to say this to him before, as I wanted to do, and I take this occasion so to do. In doing what he has done he has not exhausted himself; and I suppose I shall scarcely betray a confidence if I say that he is still working with the high ideal before his eyes to place us upon a footing of professional freedom, not only in the matter of patents, to which he has alluded, but the trade secrets which have prevented us as a craft from obtaining those things which we desire and need he is endeavoring to make open secrets. He is distributing to us, whether we know it or not, large pecuniary benefits, but he, poor fellow, is reaping no pecuniary reward. But is he a poor fellow? I do not think so. Dr. Meriam to-day would not exchange places with those who are profiting pecuniarily by just such work as he is doing free.

Before I sit down, I want to express my decided pleasure with one other feature shown in this paper. A principle has been upheld, an abuse has been attacked, and attacked forcibly, but the warfare has in no sense and at no point descended to personalities. I think that upon such lines as these we may safely continue what we may call our fight for our profession.

Dr. C. N. Peirce. While I am not an active member of your society, I am not a stranger, and I feel the more acquainted with you to-night because I am so thoroughly in accord with the delightful paper to which we have just listened. This address was not only entertaining, but instructive, and to its sentiments I can say amen with great pleasure. I think we have a vivid illustration of the necessity for such an address in the fact that we are called upon at the present time to form an association for our protection. And protection against whom or against what? Against fellow-members of *our own* profession who have taken out patents and without testing their validity have sold them to companies, that *they* might combine against and harass members of the profession. In dealing with this matter, or rather with those who ignore every sentiment

which contributes to the liberality and hence to the elevation of a profession, one feels a pardonable indignation at the sacrifice of nobility and generosity which is so essential to the growth of professional life and character. It is not in the taking out of a patent, however, that the evil lies, for that may oftentimes be a protection by the record thereof, but the subsequent disposition of it is what begets a retrogression or atavism in the character of the participant. When we fully appreciate the requirements of a "liberal profession" as they have been so clearly portrayed to-night, very few of our members, I judge, will be found willing to contribute food and fuel to combines who will use their force to our disadvantage; but until we have grown to this stature there will be a wide gap between the ideal and the real.

The profession of dentistry certainly ought to be entitled to rank with any other, and if its members appreciated the sentiments and recommendations of the essayist of this evening we should soon have a body of practitioners not only honorable but enviable.

A telegram received this morning from my friend Dr. Crouse, of Chicago, says, "Go to New York by all means, and if you have the opportunity express to the meeting to-night the great regret I have in not being present to hear the paper by Dr. Meriam, and also to urge the support of our Protective Association, in order that we may be enabled to defend ourselves against the claims of parties outside who are endeavoring to embarrass members of our profession."

Dr. S. G. Perry. I have had the honor of an acquaintance with Dr. Crouse for twenty-five years; he was a classmate of mine, and I know of no more energetic and upright man in the profession. I think that with the help of the men in the West this movement will be pushed forward with the greatest energy. I think we can support Dr. Crouse with perfect certainty that good judgment will be used in the outlay of the money, and that legal counsel will be employed who can be trusted, and that in every respect the profession will be as well protected as possible against the abuses of the Patent Company.

Dr. Peirce. A letter has been received by Dr. Crouse, of Chicago, from the Tooth Crown Company, saying that the Protective Association was injuring the business of the Tooth Crown Company, and that they would be subjected to heavy penalties if they did not at once desist from the work they were engaged in; and especially is the vice-president of the bank who is acting as treasurer of the association the subject of their displeasure. It is a thing to arouse one's indignation that a combination like this company have written to one or two gentlemen who are trying to protect themselves and their *confrères* from injustice, saying to them that they are liable to imprisonment and heavy fine for their efforts in that direction.



Dr. C. D. Cook. I have only to express my gratification at having heard this paper, which I indorse most fully. I have in my hand a letter from Prof. Holly Smith, of Baltimore, who writes strongly in favor of the side of this question which the paper discusses and advocates. Prof. Smith published in the December number of the *International Dental Journal* an excellent article on this same subject,—one that should be read by every member. The fact that it comes from a teacher in one of the old dental schools, the Baltimore College of Dentistry, lends it additional weight. I think we shall have the pleasure soon of listening to a paper by Dr. Smith, which very likely will be in this same line. It seems to me that when they say to us, "Do it if you dare," if there is any fight in us it should rather stimulate us to dare; and I think this is a good time for all of us who have not paid our ten dollars to the Protective Association to do so. I shall be glad to give my ten dollars now if there is any one here authorized to receive it, or I will send it to Dr. Crouse. I know him very well indeed, and I can fully indorse what Dr. Perry has had to say about him.

Dr. Meriam. I will say to Prof. Peirce that it is a question of making an invention the property of the profession. A man may properly sue another who has cast an aspersion upon his title to property,—an action of tort. Questioning the validity of a patent may also be made the basis of an action of tort. The question how to make an invention the property of the profession is also an important one. It may be done by publishing in our journals a description of the invention or device, with evidence that the work has been done once. It is not enough to say it has been suggested. Suggestion is not evidence.

Dentists should as a body memorialize Congress against the indiscriminate granting of patents, because patents which are supposed to be granted upon devices or processes to be used are often simply intended to prevent use. I think the best way to prevent the taking out of patents for an invention against the profession is to demonstrate in some way that the process has been at least once used, and there must be a record that is undisputed. Our journals are now open to us for this purpose. It has been said heretofore of some publishers that they gave prominence or preference to pathological articles because such articles cannot hurt the dealers. We now want something more; we want our journals to take a higher educational stand than that.

Dr. W. H. Potter. I think we all claim to belong to a liberal profession, and desire to be so recognized. I cannot help speaking of what seems to me one of the most notable dental meetings that has been held in this country. I refer to the twentieth anniversary of

Harvard Dental School on the 11th of last February. At that meeting there were present with us the president of our university, the members of our board of overseers, the members of the faculty of the medical school, and a number of distinguished clergymen. They all recognized us as belonging to a liberal profession, and it seems to me that we have gained a great point in that recognition. But they also imposed upon us very rigorous methods of action. Belonging to a liberal profession means the observance of the rules of such a profession. They laid down such rules as Dr. Meriam has spoken of to-night, and it now becomes us to assume the responsibility imposed upon us. If we belong to a liberal profession we must be liberal, and we must not only be liberal, but we must be educated. I think the time has come when we may say that it is necessary for a dentist to have a preparatory training for his profession, and the same preparatory training as is deemed necessary for a physician or a clergyman. Now if we start out with that idea, and if we make each individual member of our profession an educated man, then he will be considered as belonging to a liberal profession when he studies dentistry and practices it. It seems to me that the thing which we should give especial attention to is the preliminary education of students, to make them broad-minded and well-educated men, and then of necessity they will grow into a broad and liberal profession.

Dr. W. H. Atkinson. It would be almost invidious and selfish for me to say that I am very happy to-night, because it seems that the seed that was sown in my organization by the ancestral line from which I came is coming to perfect fruitage. I am a poor man to-day because I had the idea that it was a good thing to help some one else. All you who know anything about what my course has been know that when I have made a discovery or an improvement in practice, as soon as I have tried it and found it to satisfy my own apprehension, I have communicated it as far as I could to others. That now seems to be the trend of things on this point, where I have so many times almost disgusted you with saying that the measure of a man was the size of his moral character always, and that it was that kind of righteousness that bound us together in unity of interests and that made us go against these people who snoop around into every man's corner of intellect and affection and skill to see if they could not make something out of his illumination. I am the first man who put his name on the list when this matter was started in Philadelphia, and who paid his ten dollars to this Protective Association of Dr. Crouse's. This is my sugar-stick (Dr. Meriam), and I wanted to kiss him for almost every word he said. Through it all there was manifest a gentlemanly tone, and a true moral character pervaded every sentiment and the very tone of his voice while speak-

ing. If we will do our fighting in that manner we will not have any "scalawags" among us, and the "scalawagism" in us will ooze out by reason of the healthy growth which affords no room for retrogression.

Dr. Geo. L. Parmele. I am on the fence. *Not* as regards the question under discussion, but as to the location of my office, it being midway between New York and Boston, from both of which places you have just heard. Last week I was in Boston at the Harvard alumni dinner and celebration, where I listened to similar views to those here expressed. In conversation there with Dr. Meriam I told him I should have the pleasure of listening to his paper to-night, and he asked me to say anything I could in the way of indorsing the subject. After what we have heard, I do not think it at all necessary. I am heartily in sympathy with his views, and have always tried to steer as near the principles he advocates as possible. I wish I had the power to tell you all I feel in relation to this subject, but it never was in me to address a meeting without notes. Still, it does not seem to me that I could add much, but simply voice the sentiment already so ably expressed. I am strongly opposed to monopolies, combinations, and professional patents.

Dr. Bogue. May I be allowed one moment to bring up a thought that was suggested by Dr. Ives? The clear-cut idea which Dr. Meriam has presented this evening has probably not existed in the minds of our professional brethren in the past. I am quite free to say that I have not seen it exactly in this light, nor has Dr. Ives, and some of the rest tell me substantially the same thing. But it has now been enunciated, and it goes forth to the profession. It seems to me that we should not condemn those who have never held such ideas in the past; that is gone. But for the future, if we really do aspire to be professional men, let us take the ground that has been so ably marked out by Dr. Meriam, and supplemented by Dr. Potter a moment since, and then we shall receive all the professional recognition that we deserve.

Dr. G. A. Gerry. I feel a special interest in this paper from the fact that the essayist took his first steps in dentistry in my office. I never have had reason to feel ashamed of him, and I certainly do not to-night. Neither am I ashamed of the sentiments he has expressed. He has been called by some an enthusiast. Enthusiasts have done pretty good work! Ericsson, who has just died, was called one. His hobby was the "Monitor." When that craft was launched it was laughed at, but when it belched forth its fire and smoke and destroyed the "Merrimac," then Ericsson became a patriot. It will be so, I believe, with Dr. Meriam. He will be looked up to as the great promoter and agitator of this subject.



The manufacturers of instruments have told us that dentistry never could have been what it is without them,—that they have been the making of the dentists. I would like to speak of one instrument which has become of great use in dentistry, the dental engine. The first dental engine that I remember was, I think, the Morrison. Did the manufacturers encourage that? I think not. Instead of encouraging it they bought up what was then known as the sheep-shearing machine and the horse-clipping machine, and then obtained an injunction to prevent Morrison from manufacturing his engine. While at a meeting of the First District Dental Society some three or four years ago in New York, I saw an instrument which was then known as the Hodge-Weber engine. I believed then it was the best engine I had ever seen, and I ordered one. I never have been able to get it. I have inquired about it perhaps twenty times of the firm which now owns the patent, and all the answer I can get is that they have not had time to make it. Yet, if I have been correctly informed, there were two hundred of the engines made and ready to be put together. That engine never will be sold as long as an instrument which costs less to make can be forced upon the profession. I do not think that a new Bonwill engine can be bought to-day. I have not seen one for several years. Still, the old ones are used by a great many dentists, who consider it better than any other. I believe that instrument-makers have done more, in certain ways, to hurt the profession than they have to advance it, and I believe that the quicker we get out of the combination that buys patents, controls patents, and shelves them the better it will be for us.

Dr. Meriam. We gathered some years ago from all parts of the country to make welcome and to witness the operations of a man from abroad, Dr. Herbst. Were we fools to go a distance to see a man like Dr. Herbst, or did he have something to show? The real interest in Dr. Herbst to me was not in the number of useful methods or in the simplicity of the things that he used. There was a practical demonstration that the resources of dentistry were in the arts and sciences about every man's door. He had none of our boasted nickel-plated advantages, but his work ranked with the best American practice. Now while we acknowledge that there are some machine-made men,—I think there are some in the profession yet,—we have to admit that Dr. Herbst is a practical demonstration of the fact that dentistry exists independently of the machine-men, and it is just as well that, while we are admiring Dr. Herbst's methods, we should learn the lesson of Dr. Herbst also.

Dr. S. B. Palmer. Two attractions united to draw me to this meeting: my desire to meet the members of this society, and the magnetic influence of the essayist. I wanted very much to hear one

whom I regard a pioneer working for the emancipation of dentistry from the bondage of monopoly. The sentiments expressed by this society to-night indicate that the essayist has almost unanimous backing in his endeavor in this direction. Expression of my views would be a repetition of what has been said in commendation of the paper and the subject. I will add my indorsement and amen in the language of an old-time school commissioner who visited a country school in company with another holding the same office. One did all the talking and made all the suggestions, the other performed his duties by occasionally rising to his feet and exclaiming, "Them's my sentiments exactly." So I can say in regard to the discussions of this paper. While I am in no way personally interested in crown- and bridge-work, many of my professional brethren are, and are suffering persecution. As a profession we should demand that justice be done to all its members. I trust this beginning will lead to the formation of a national protective organization with sufficient ability to protect its members against exorbitant royalties based upon illegal demands.

In regard to the protection offered from Chicago, I received a circular before leaving home, and would have responded favorably to it had I not expected to meet you here to-night and learn what New York had to say about it. I am pleased to learn of the support given Dr. Crouse.

Dr. Cook. I would like to ask Dr. Gerry whether in his remarks this evening he referred to the Weber-Perry engine or some other?

Dr. Gerry. The engine of which I spoke was exhibited before the First District Dental Society in this city two or three years ago. I think but two of the engines were ever finished, one of which was exhibited at the meeting referred to, and the other I saw at the depot of the New York Dental Manufacturing Company.

Dr. Perry. Mr. President, may I say a word in reference to that engine? Not being satisfied with the poor mechanism of the Bonwill engine, nor with the unsteady movement of all the cable engines, I started with the idea of having something manufactured that would be more satisfactory than either, assuming that dentists should have the finest of all mechanism. After many experiments by Mr. Weber and myself, many changes in the instrument, and the spending of a great deal of time and money, we finally worked out an engine which was completed, and is the one probably which has been referred to. After that engine was finished and was seen in my office by quite a number of my friends, the question arose, Can such an engine be made for them? When that question was put to Mr. Weber, his answer was that it could not be made unless patents were taken upon it to protect its manufacture. Therefore, taking

the advice of my friends and of Mr. Weber, I took out a patent for that part of the engine which was my distinct invention, and Mr. Weber took a patent for his part. It was a combination engine, and could not have existed but for our joint efforts. There was no man working for the profession who had such mechanical skill and accuracy as Mr. Weber, nor such genius in simplifying machinery. It was his intention to make a large number of these engines. I do not know whether they were ever commenced or not, but only two were finished. About that time there came the financial difficulties of the New York Company, which ended by its being bought up by the S. S. White Company, which also came into possession of Mr. Weber's patent for his part of the engine. I still own the patent which I took on my part of it. I have been asked a great many times if there was any way of having that engine manufactured, and I have been obliged to say that I did not know of any way and could not do anything in the matter. I have heard it remarked that the S. S. White Company intended some day to have the engine manufactured, but whether they have that intention or not I do not know. Any attempt by others to manufacture it would probably only result in opening up questions that would be unpleasant on every side.

Now in regard to the matter of patents I do not know that I can say anything more in favor of the paper, or express my appreciation of its sentiments better, than by saying that if I should live to be a thousand years old, and should ever have the good fortune to devise any means by which our work could be made easier, I should never take a patent on it.

One thing more, gentlemen: I took a patent also for the separators that I devised. The S. S. White Dental Manufacturing Company owned Dr. Jarvis's patent, and I believed that all of the necessary steps could be more surely taken to secure the manufacture of good instruments if they were covered by a patent. And I must say to the credit of the S. S. White Company that they did everything they could to make the instruments according to my idea. That patent was sold to them, and I now have no interest in it. I have never received a penny from it, except for the transfer of the patent; and, gentlemen, it is the regret of my life that I ever took a penny for it. I would give a great deal to-day if I had never taken the patent for either the engine or the separators. I did not appreciate then as I do to-day the danger to our profession from this mania for taking patents.

Dr. Meriam. I am told that makers of scientific instruments do not patent. The late Dr. Alva Clark, world-renowned as the maker of telescopes, never patented or kept secret any of his methods or



their results. It is wonderful to see what an amount of bolstering "well-known superiority of manufacture" seems to require. The proud position of a self-respecting workman or professional man should be, "Here I stand, beat my work if you can;" not by patents or secrets to exclude competition, and thus claim the highest place. It is easy to rank first in a class of one, but, perhaps, hardly creditable to arrange such a class for that purpose.

When the Pettee reamer was first made, the springs often broke, and I made others from piano-wire, wound without drawing the temper, that proved much more durable. When I found that the students at the school were troubled by the breaking of the springs in their dental engines, I told them they would get more lasting ones by making them in the same way of piano-wire wound on a mandrel of right size. I should have been but a poor teacher not to have taught them this, and was much amused to hear of an instrument-maker's employee saying, "They had better look out what they do down there or they will get into trouble."

I wonder if there is any other department of Harvard University where instrument-makers can say what shall not be taught students. I presume that patents give them this right, but it certainly cannot give students a high idea of the place the profession holds in the world. I asked Dr. Cheever if he wished instrument-makers to send such messages to the Harvard Medical School or to the Hospital.

We do not allow our laboratory workmen to run our offices, and we should not allow instrument-makers to run our societies or the profession.

Dr. Gerry. I would say that in conversation with Mr. Ash, in his own store in London a year ago, he said they had disposed of the Shaw engine to the S. S. White Company, and that he had expected to get something out of it, but that it was so managed that he received nothing comparatively. I judged from what he said that the patentee had disposed of the patent for this country, although he did not reap any reward from it.

Dr. Sudduth. I have been so busy taking notes of the meeting, not for publication but for my own information, that I have not kept the speeches in my mind in a way to discuss the subject very intelligently. There were one or two points in the essay that seemed to come home. One was in regard to our journals. It seems to me impossible, with our literature owned and controlled in its publication by trade associations, to have the right kind of sentiments and ideas go out to the profession, or to educate the profession in the right way. I have a little sample of that in the journal which I hold in my hand, in regard to the way in which certain matters that come before the profession in a professional way are treated in

our journals by writers who favor the trade side of the question. At a meeting in Boston last summer a very reputable and thoroughly professional gentleman presented a matter of great interest to the dental profession; I speak of Dr. MacLean's method of sharpening instruments; and I must say that until I saw that method practically demonstrated I never knew what a sharp instrument was. With it an edge can be put on an excavator that will split a hair, and the use of such sharp instruments is beyond anything that I know of for the relief of sensitive dentine. Dr. MacLean gave to the profession his method to use without let or hindrance. A report of that meeting, signed by "Odontoblast," was sent to the *Dental Review*, and was, as I look at it, a scurrilous attack upon Dr. Meriam in regard to his method of managing that meeting,—which was one of the best meetings as to professional tone that I have ever attended,—and especially upon Dr. MacLean, slurring about the insignificance of his presentation. It was also published in the *Western Dental Journal* with editorial comments. The article in question stated that the method was not new, that it was simply an effort to make a mountain out of a molehill, and that this method had been used for years by manufacturers, and all that. If it had been in use for years in the shops of our manufacturers, they took great pains that it did not get out to the profession, while Dr. MacLean gave it freely to the profession, thus showing the difference between the professional and the trade spirit.

So long as our dental journals will take the position of making themselves the tools of trade, and will print such scurrilous attacks upon gentlemen who have the professional dignity and honor to give to the profession the methods they have discovered, so long will we be a trade, because we cannot rise above the source from which we get our daily food. I want to say a word in defense of Dr. Low. A great many dentists have a feeling of resentment toward Dr. Low for patenting his process of making bridge-work. I have it from a reliable source that Dr. Low had a paper already prepared for the publication of his invention, and had taken his patent simply for the purpose of claiming originality and then giving it to the profession, and that the treatment he received from the dentists of the Illinois State Dental Society so embittered him that he sold the patent. It is this harsh treatment of men who are willing to give us the results of their thought and work that gets us into trouble in many instances.

Another point in regard to patents. No patent is of any value until it has been tested in the courts. The way to protect an invention is to publish a description of it, which is fully as efficient a protection as to obtain a patent. It is only necessary to prove that

it was put into actual use and was offered for publication, whether it was published or not, in order to claim originality. Therefore all little inventions should be offered for publication. Dr. Dwinelle spoke of taking out patents for the purpose of protection. The objection is that those patents may pass out of the hands of dentists and into the hands of those who will use them against us. It is the power that patents carry with them that makes them dangerous. I think it is a good point, well brought out, that we should put our little inventions, whatever they may be, into some journal that is willing and anxious to publish them. We want to get into our journals not only articles on pathology, but every little device that the dentist has in his office.

There are a great many men in the dental profession who have obtained patents upon inventions and have received no pecuniary advantage whatever from them. It all goes into the hands of the manufacturer. Not one man in a thousand has received any pecuniary benefit on his patent. But the heaven is working, and its effects may be seen in the advertising columns of our dental journals. We never can attain to the dignity of a profession until we act like professional men in our daily practice.

Dr. Dwinelle. Dr. Sudduth says that when we make inventions the only way we can secure them to ourselves and get the credit and benefit of them is to publish them. In that connection I wish to say, and I think the fact is familiar to most members of the profession, that in 1855 I made a certain invention which has been characterized by others as the cup-crown and bridge invention, which is illustrated by engravings and set forth in the journals of that day. It is so fully set forth that other reviewers have taken it up and alluded to it; Dr. W. Storer How speaks of it in his article, "The Evolution of Artificial Tooth-caps and Cap-crowns," etc., wherein he says my invention was the basis of the whole cap and bridge system. But that did not prevent the patenting of my invention more than thirty years after that time. How, then, can we secure ourselves by publication? The publication of an invention for more than thirty years was no security. We are surrounded by a network of patents and its system of robbery; the scalawag system of thieves coming into our laboratories, stealing our inventions, having them patented, and then blackmailing us for using our own inventions is familiar to us all.

Dr. Sudduth. Did you cement that bridge on the teeth?

Dr. Dwinelle. I did. I used Canada balsam for the purpose in conjunction with screws. It seems to me that the only way we can secure ourselves is to get our inventions patented and then give them to the profession.



Dr. Meriam. Would they be any more secure then ?

Dr. Dwinelle. Certainly. There is no security in publication. Our past experience proves this.

Dr. Meriam. The taking of patents on instruments or inventions by members of the medical profession would destroy it as a liberal profession. Patenting is not a safeguard against litigation, but, on the contrary, leads to it, and some of the fiercest legal battles are fought between rival patentees. I find that it is necessary to bring an invention into use, and that use must be such a use that it is commonly known. A plan or suggestion of doing a thing is not sufficient. The thing must actually be done; then it must be described in such a manner as to make a record.

Dr. Dwinelle. The idea suggested was that when an invention is published and given to the world it belongs to the world. But another man patents it, and it immediately becomes his property!

I think the real question is that of professional prestige. Physicians have no trouble in presenting to the profession the appliances they invent, because they are a part of their professional life, and the man who would patent a pair of forceps would be considered a renegade by the whole medical profession. Professional prestige is held to be above a little money. Go to Harvard to-day, and near the cottage of President Eliot will be seen the palace of a quack doctor. Whose reputation is the more desirable?

Dr. Bogue. I never before understood how it was that Dr. Perry and I came to be by the ears before the profession. It is that payment that was made him for his patents that has done the mischief. He and I had been working on different lines on our separators, yet the profession to-day probably regards me as an interloper on him. The White Company, through Dr. J. W. White, told me they did not care to make the instrument which I had devised, and which I had published in France in December, previous to Dr. Perry's publication, because it cost too much. Of course it cost too much! Each instrument has certain decided advantages, but the patented instrument with money already invested in it is the one that pays best to manufacture. The controversy was dropped between Dr. Perry and myself at once; but the reason why this peculiar difficulty has arisen never occurred to me until to-night. I now see it.

President Howe. I cannot allow this opportunity to pass without putting myself on record in the questions discussed by Dr. Meriam. I approve wholly of the high ethical ground that he has taken, and the standard that he has erected of a liberal profession. I am willing to believe that in the past a dentist who has patented an appliance or a device generally has supposed that he was furthering the advance of his profession, at the same time thinking it

nothing more than fair to himself that he should secure, or try to secure, some remuneration for the time and money expended in the effort to produce what he has made. But it seems to me plain that instead of patents being favorable to the advancement of the profession, in the use of devices that the profession may require, they are really a hindrance to such progress. Take any instrument that we know of that is patented and is in the hands of manufacturers; the patent is actually a hindrance to the improvement of the instrument by any person who might be capable of improving it. Every man is likely to think, in the exultation natural to him in the consciousness of inventive skill, that he has a right to say Eureka! but we know that all devices that have been made are capable of almost indefinite improvement; almost all such things that come to anything approaching perfection are the result of growth; yet the moment a patent is in the hands of a manufacturer, if he chooses,—and he generally does,—he may prevent any one else from making any such thing as is covered by that patent. There are to my knowledge many devices in the market to-day, which many of you gentlemen use, or others perhaps that you do not use because of their defects, which you might improve if you had the liberty to do so, but you have not. Then, again, a patent goes into the hands of a manufacturer, and is used not for the purpose of making the device, but merely to prevent others from making it. It is held not for the benefit of the profession, but to sell some other device, machine, or tool for doing the same work. That point has only to be suggested to call to your minds the long list of instruments you cannot get, because the patents are held by manufacturers who decline to either put the goods in the market themselves or allow others to do so.

Dr. Meriam. It is the common experience of inventors to find more than one way of doing the same thing. I have a patient who has acted as counsel for a manufacturer to enforce a contract with a man who left their employ; he had sold an invention to them, or rather had worked as an expert, giving them all his inventions, and then had severed his connection after signing a contract to sell all his inventions for a subsequent period of years, so that any invention which he might make should not detract from the value of the previous inventions which he had sold them. That seems a reasonable protection on the part of the manufacturer. But, gentlemen, can you think of Agassiz or any scientist holding back a book or discovery so that the publisher or maker might have a chance to sell off others? I remember of being told of a man who would “invent a thing and sell it and then go to work and invent another one to beat it.” That seems to be a very mean thing from a maker’s standpoint. But it is the honor of the doctor or teacher; he will treat or

teach in one way until he finds out a better, and then he will employ that.

On motion of Dr. Ives, the thanks of the society were tendered to Dr. Meriam for his very able address.

Adjourned.

S. E. DAVENPORT, D.D.S., M.D.S.,  
*Editor New York Odontological Society.*

### FLORIDA STATE DENTAL ASSOCIATION.

THE sixth annual meeting of the Florida State Dental Association was held in Ocala, on the 10th and 11th of April, 1889.

The sessions were exceedingly interesting and instructive, and, like all other institutions in this State, it is rapidly improving in numbers and usefulness.

Dr. B. T. Cowart, of Tampa, the retiring president, delivered an admirable address.

Interesting discussions followed, participated in by most of the members present. The subject of dental appointments in the United States army and navy, which was presented to the association at the last meeting, held at St. Augustine, by Dr. J. C. Perine, of Ocala, was considered with favor, and Dr. C. P. Carver, of St. Augustine, and Dr. J. C. Perine were instructed to present the matter before Congress at its next session.

Clinics were given by Dr. James Chase, of Ocala, and others. New and improved filling-instruments made by The S. S. White Company were presented, and a novel method of facing teeth with pearl was introduced by Dr. Perine, which was followed by an interesting discussion.

The following officers were elected for the ensuing year:

C. P. Carver, president; L. M. Frink, first vice-president; R. D. Fuller, second vice-president; J. C. Perine, recording secretary; L. F. Frink, corresponding secretary; J. O. Haynes, treasurer.

The association adjourned to meet in Jacksonville, the second Wednesday in April, 1890.

J. C. PERINE, *Secretary*, Ocala, Fla.

### CHICAGO DENTAL SOCIETY.

At the annual meeting of the Chicago Dental Society, held on Tuesday evening, April 2, 1889, the following named were elected officers for the ensuing year: P. J. Kester, president; D. M. Cattell, first vice-president; W. J. Martin, second vice-president; A. E. Baldwin, secretary; Louis Ottofy, corresponding secretary; E. D. Swain,



treasurer; A. W. Harlan, librarian; member of the Executive Committee, J. Austin Dunn; Board of Censors, F. H. Gardiner, C. F. Hartt, and L. L. Davis.

Delegates to the International Dental Congress at Paris, France, September 1 to 8, 1889, were appointed as follows: A. W. Harlan (secretary); J. N. Crouse, T. W. Brophy, J. A. Swasey, P. J. Kester, W. W. Allport, A. E. Baldwin, Louis Ottofy, L. L. Davis, J. W. Wasall, and W. B. Ames.

A report from Dr. Crouse showed the Dental Protective Association of the United States to be flourishing, and dentists throughout the United States are requested to become members of this association.

LOUIS OTTOFY, *Cor. Sec.*

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#### CALIFORNIA STATE DENTAL ASSOCIATION.

THE twentieth annual meeting of the California State Dental Association will be held in San Francisco, commencing on the third Tuesday in July, and continuing four days.

W. Z. KING, *Cor. Secretary*,  
San Francisco, Cal.

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#### INDIANA STATE DENTAL ASSOCIATION.

THE thirty-first annual meeting of the Indiana State Dental Association will be held at Indianapolis, commencing on Tuesday, June 25, 1889, and continuing four days.

R. W. VAN VALZAH, *Secretary*,  
Terre Haute, Ind.

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#### NEW JERSEY STATE DENTAL SOCIETY.

THE annual meeting of the New Jersey State Dental Society will be held at Asbury Park, N. J., commencing July 17, 1889, the sessions to continue for three days.

CHAS. A. MEEKER, D.D.S., *Secretary*,  
Newark, N. J.

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#### MINNESOTA STATE BOARD OF DENTAL EXAMINERS.

THE Minnesota State Board of Dental Examiners will convene in regular session at the Hotel St. Louis, Duluth, Minn., at 9 o'clock A.M., on Monday, July 8, 1889.

H. A. KNIGHT, *Secretary*,  
608 Nicollet ave., Minneapolis, Minn.

## AMERICAN MEDICAL ASSOCIATION.

THE fortieth annual meeting of the American Medical Association will be held at Newport, R. I., June 25, 26, 27, and 28, 1889.

Those who contemplate contributing papers to the Dental Section should send the name of subject to the secretary as soon as possible. Papers of unusual interest and of a highly scientific character will be read.

EUGENE S. TALBOT,  
*Secretary of Dental Section,*  
No. 125 State street, Chicago, Ill.

## UNIVERSITY OF MICHIGAN DENTAL ALUMNI.

At the annual meeting of the alumni of the University of Michigan, Dental Department, held in Ann Arbor, June, 1888, a committee was appointed to take steps toward securing a large attendance at the next meeting in 1889. The committee ask that addresses be forwarded at once, so that each alumnus may receive a personal invitation.

At the meeting, which will be held during commencement week in June, 1889, a special reunion of all classes previous to 1880 has been planned.

An invitation is extended to classes graduated since 1880 to hold reunions at the same time, and the committee promise to gladly assist in their organization.

L. L. DAVIS (Class of '84),  
*Chairman of Committee,*  
Chicago, Ill.

## DENTAL COLLEGE COMMENCEMENTS.

## UNIVERSITY OF PENNSYLVANIA—DEPARTMENT OF DENTISTRY.

THE tenth annual commencement of the Department of Dentistry of the University of Pennsylvania was held, in connection with that of the Medical Department, at the American Academy of Music, Philadelphia, May 1, 1889, at 12 o'clock m.

The valedictory address was delivered by William Osler, M.D., professor of clinical medicine.

The number of matriculates for the session was one hundred and twenty-seven.

The degree of D.D.S. was conferred on the following graduates by William Pepper, M.D., LL.D., provost of the university:

NAME.	STATE.	NAME.	STATE.
Robert W. Albury.....	Bahamas.	Frank E. Lamson.....	Massachusetts.
Victor M. Ayala.....	Cuba.	William F. Lamson.....	New York.
George E. Barnett.....	Washington Ter.	Walter J. Leake.....	New York.
James A. Bruce.....	Australia.	Henry A. Lit'ig.....	Iowa.
Antonio D. Calves.....	Cuba.	George Luxenburger.....	Pennsylvania.
Lucas W. Cheney.....	Massachusetts.	George H. Mayer.....	Pennsylvania.
Edward J. M. Cooney.....	Rhode Island.	José Luis Miro.....	Cuba.
Arthur W. Cooper.....	Nebraska.	Peter S. Mogel.....	Pennsylvania.
W. A. Culpeper.....	M.D. West Indies.	Emilio Nunez.....	Cuba.
George D. B. Darby.....	Pennsylvania.	William Oser.....	Switzerland.
William P. DeLacy.....	Pennsylvania.	Ira W. Parry.....	New York.
J. Edward DeWalt.....	Illinois.	Frederic A. Peeso.....	New York.
Walter R. Diehl.....	Pennsylvania.	Joseph C. Reap.....	Pennsylvania.
Henry T. Dunbar.....	Vermont.	Frank W. Rees.....	Washington Ter.
Horace E. Eaton.....	Nova Scotia.	Leroy Requa.....	New York.
Norman S. Essig.....	Pennsylvania.	Charles E. Rhone.....	Pennsylvania.
William F. Faust.....	Pennsylvania.	John Best Robinson.....	Pennsylvania.
Frank D. Focht.....	Pennsylvania.	George S. Ro t.....	New York.
J. Merritt Fordham.....	Pennsylvania.	Frank E. Roys.....	Connecticut.
John G. Fuller.....	Pennsylvania.	Frank P. Seibold.....	Pennsylvania.
Georg Gerhards.....	Germany.	Wm E. Stiles, M.D.....	Pennsylvania.
Adin A. Goldsmith.....	New Hampshire.	Frederick M. Stine.....	Washington Ter.
Sam'l L. Goldsmith.....	Pennsylvania.	Robert W. Sweetnam.....	Michigan.
George R. Gray.....	Massachusetts.	Rose-rans Trogdon.....	Illinois.
George A. Grotefend.....	California.	Miguel A. Velazquez.....	Costa Rica.
Albert F. Guiteras.....	Cuba.	Leonard Whit.....	South Carolina.
Frank T. Hart.....	New Jersey.	William H. Wix.....	Delaware.
Cornelius F. Horgan.....	Pennsylvania.	Wilber S. Woodward.....	Ohio.
Charles Keyes.....	Brazil	Charles G. Woolsey.....	Pennsylvania.

## EDITORIAL.

### PROFESSIONAL AND BUSINESS ETHICS.

THE leading position and unusual space have been accorded in this issue in order to present Dr. Meriam's paper and a report of the discussion which followed its reading before the New York Odontological Society.

We are impelled to this departure from the rule which excludes from our reading-pages matter relating to the business affairs of the company publisher of the DENTAL COSMOS, for the reason that in this instance the circumstances are exceptional, and in our judgment justify the departure. There is much in the paper and in the discussions that is ill digested, irrelevant, offensively personal, and calculated if not intended to produce a false impression on the minds of our readers. We cannot see otherwise than that many of the utterances were unworthy of expression on the announced subject, and before the honorable and honored society whose reported proceedings are usually of such a high grade.

We now call attention to but one of the statements reported in the discussions, although others are equally incorrect. Dr. G. A. Gerry remarked as follows:



"While at a meeting of the First District Dental Society some three or four years ago in New York, I saw an instrument which was then known as the Hodge-Weber engine. I believed then it was the best engine I had ever seen, and I ordered one. I never have been able to get it. I have inquired about it perhaps twenty times of the firm which now owns the patent, and all the answer I can get is that they have not had time to make it. Yet, if I have been correctly informed, there were two hundred of the engines made and ready to be put together. That engine never will be sold as long as an instrument which costs less to make can be forced upon the profession. I do not think that a new Bonwill engine can be bought to day. I have not seen one for several years."

The engine to which Dr. Gerry refers was first shown a little more than two years ago by the New York Manufacturing Company. When that company closed out their stock to the S. S. White Company, including all the rights which they held in this engine, there were not "two hundred made and ready to be put together." There were not two of them made, either in whole or in part. One single model engine was all that came into our possession, and without a single pattern or tool ready or even commenced for use in manufacture. Any one at all familiar with the requirements of manufacturing such machines on a large scale knows that after a model is approved it takes a considerable time to prepare patterns and tools, and then to put the finished article on the market. But in this case the model was not approved; it was not entirely satisfactory even to Mr. Weber, who had done more than any one else to develop it. We were confident that we could improve it, and give to the profession a much better engine. Mr. Weber and our other experts were very much occupied with other work, and we found it impossible to direct the unceasing attention of any one of them to this task; but as opportunity offered several models were made, the final one—one that we are willing to offer—having been submitted to us only a few days ago. The preparation of patterns and tools for manufacturing these engines will now proceed as fast as possible, and we hope before a great while to have the engine ready for sale. We are not surprised that the unavoidable delay has subjected us to criticism, but we are very sure that no one has been more troubled thereby than ourselves. We believe that this engine will be a decided advance on any cord engine heretofore made, and therefore feel a natural anxiety to bring it out. We furthermore claim that no fact in the history of the house warrants such a remark as, "That engine never will be sold as long as an instrument which costs less to make can be forced upon the profession."

With regard to the Bonwill engine referred to by Dr. Gerry, we have only to say that they are and have been in stock since Dr. Bonwill turned over their manufacture to us, except for a period between the exhaustion of the first lot made and the manufacture of a second supply.

As to the main question, the propriety or impropriety of professional men patenting mechanical devices, there will be naturally a diversity of opinion. There can be no question concerning the principle upon which patent rights are granted for a term of years for new inventions. It is conceded to be founded in the strictest equity, and is as just as the principle upon which any other right of property is based. No one would object if a professional man should secure a patent for a car-coupler or for anything else outside of his profession; and whether or not it is proper for a professional man to take out a patent on an appliance intended for professional use is a matter to be determined under the rules of a recognized standard of professional ethics. But that a *non*-professional man may devise, patent, manufacture, and sell an instrument, tool, or appliance intended and adapted for professional use has never been questioned. Nor is he amenable to the code of professional ethics for so doing. Had the author of the paper confined himself to a discussion of the relations of dentists to each other, what professional ethics are or should be, he would have been strictly within the lines of propriety; but he has gone out of his way to make flings calculated to produce false impressions, and which demand reply. The repeated use of the term "combination" with the evident intent to create or foster the idea that dental manufacturers and dealers have combined to oppress the dental profession is without the shadow of truthful foundation, and it requires no little charity to accept the thought that the writer was sincere in such presentation of the matter.

The following paragraphs, for instance, were not pertinent to his topic, and were unworthy of the occasion :

"A leading American practitioner writes me, 'We are fast becoming a mere tender to a trade association, and about all the liberty there is left us is the right to buy goods.'"

"It is interesting to note in connection with the assertion that the combination has nothing to do with prices, that they have been reduced only in materials that come into competition with it and can be bought outside "

"With the combination of instrument-makers and others called by those who compose it the 'Dental Trade Association' we are concerned, as it affects our profession. It is not something we are at liberty to discuss if we wish; but if its effects are such as to keep dental requirements from the usual channels of medical and other scientific supplies, or to hinder competent persons engaging in our service, it becomes a question that it is our duty to discuss, and one which we have no right to omit."

It is well known to all those who have taken the trouble to inform themselves that the American Dental Trade Association has nothing to do with determining the prices which any manufacturer shall place upon his goods. Competition is as open as ever, and each

manufacturer is as free as ever to make any class of goods he sees proper, and to fix the prices for the same. The association is open to all reputable manufacturers and dealers who are willing to be governed by the few simple rules which have been adopted by its members.

The association has, however, done much to make the dealing in dental supplies a reputable and safe business, enabling the dealer to carry a stock proportioned to the needs of his patrons, without the risk of being undersold by a traveling agent or a rival dealer in the same make of goods. It recognizes three classes of purchasers,—dealers, dentists, and students,—and provides that each shall be entitled to a certain consideration based on his position in one or other of these classes. The unseemly strife for business which formerly led to misrepresentation, to evasion, to all sorts of unfairness, and which was fast degrading the dealer and the dentist alike, is thus prevented, and the interests of manufacturers, dealers, and dentists are alike promoted.

To speak of an association having in view only to reform abuses, to secure unity of action, to promote a friendly intercourse between its members, and to avoid and adjust differences and misunderstanding among those engaged in the dental trade as a "combination" in the sense of its being intended to oppress dentists; to couple it with a thing of odious memory; to link it with "Judas," is an unwarrantable defamation, of which an honest and intelligent man should not have been guilty.

The practice of dentistry is one thing; the devising, manufacturing, and selling of supplies adapted to dental practice is another thing altogether. While manufacturers and dealers are not bound by professional ethics, they are bound to observe business ethics, which, though conventionally divergent from professional ethics, are based on a similar foundation, and are as binding in the one case as in the other,—founded, as they all profess to be, on the golden rule.

As in every other human industry, manufacturers of dental goods strive for a livelihood, and if they establish and maintain a code of honor among themselves to insure fair dealing with each other and with those whose needs and desires they supply, they are entitled to honorable mention and not to innuendoes and sarcasm.

Furthermore it may be said that back of professional and dental society ethics, underlying the ethics which govern the intercourse of man with man in all relations, is the eternal principle of justice, antedating all conventionalities and demanding the obedience of all.

Dr. Meriam may well expend thought and labor in the effort to elevate the profession to which he belongs, and in which there is still room for the earnest efforts of its best minds and hearts. If he and



they in such laudable endeavors shall attain and maintain a higher literary, ethical, and professional standard than heretofore, they will have no more consistently earnest supporter than the DENTAL COSMOS.

We commend to Dr. Meriam the story of the little boy who was fond of singing "I want to be an angel," of whom a visitor to the house more practical than sentimental, and who had not recognized the development of any distinctively angelic qualities in the lad, asked, "Hadh't you better try and be a good boy first?"

### DYNAMIO ELECTRICITY.

THE increasing interest manifested in the various applications of electric force as a motor calls for a careful study and a due appreciation of the distinction between the several currents which are in use. We therefore give space with pleasure to the following letter from Dr. Kells, in reply to the editorial in the March issue of the DENTAL COSMOS:

DR. J. W. WHITE, EDITOR DENTAL COSMOS:

*Dear Doctor*,—Our profession is now looking to electrical energy, as received from central electric light and power stations, to relieve it of many of the burdens and inconveniences attending the use of any of the forms of *power* in the dental office.

The interest upon the subject being just about awakened, your editorial and annexed correspondence in the March COSMOS, it appears to me, rather strains a point, and may lead many to believe that the use of the electric current under discussion must necessarily carry with it the liability, at some time or another, to disastrous results.

History recounts that many years ago the good people of Philadelphia were very much exercised over the bold proposition to lay gas mains under the streets, throughout the city, and illuminate its thoroughfares and buildings with that inflammable, explosive, and altogether dangerous vapor. The daily papers contained long editorials upon the inevitable destruction of the city and its inhabitants as a result of such a modern and preposterous idea. The gas mains were laid, however; the city is still there, and evidently after 101 these many years, some of those same people having escaped explosions, asphyxiation, and annihilation, are still "alive and kicking," and this time it is the *electric mains* that suffer!

That there have been accidents in consequence of the introduction of electric lighting systems, we will admit, but no doubt in all these cases they may be attributed to two causes and two alone: first, carelessness; and second, defective construction.

Upon the question of *quality of current* and *relative danger*, the general idea is very vague, and by the articles to which I am taking exception not much light is thrown upon it.

The comparison of the different electric currents as found upon street wires to the flow of water through various sizes of pipes hardly goes far enough. Let us add to that illustration as follows: "You wish to run a water motor in your office. In the street is a twenty-four inch main under a heavy pressure. To bring that *main* into your office and connect your motor directly to it would

jeopardize your life, for if by accident it was broken within your premises, the enormous quantity of water that would be poured into the room would fill it instantly and all escape would be impossible. Therefore be wise, and run a three-quarter inch pipe from the main to the motor, and then if any accident should happen to the supply-pipe, a little harmless though unpleasant wetting will be the only result. For no matter what the pressure may be in the street main, it will be impossible for such a supply-pipe to convey into your office enough water to threaten your life."

Therefore do the same, if you propose to draw upon the electric street mains. From them you may take just what you need; proper precautions being possible to insure that no heavy and dangerous currents can be led in unawares.

It will hardly do to pass over the alternating current as "not being applicable for motor purposes,"—for alternating current motors are an accomplished fact, and we should certainly expect to see within the next few years as great strides made in their perfection and exploitation as have been made in the past with the constant current motor.

The three classes of electric currents that may be presented for our use are what are called the "high-tension," "low-tension," and "alternating currents,"—the last named being also high tension as far as the mains are concerned.

The first class—the high-tension or arc-light currents—we *must insist* should never be brought into a dental office, for no precautions can be taken to render them absolutely safe for our purposes.

The "alternating" current may be by suitable "transformers" (to be placed *always* without the office building) toned down to one of a harmless strength, and with proper precautions introduced with safety into our offices; but not being adapted to the electric mallet, it does not quite "*fill the bill*."

The low-tension system is in very general use by the Edison companies scattered throughout the land, and from it may be derived a current absolutely without danger, and available for all purposes. If we gauge our supply wires and "cut-outs" according to our needs, it will be impossible for a greater quantity of the *normal* current upon the mains to reach us than that for which we compute. And if through the agency of "tornadoes, falling walls, or fire," a high potential current should be crossed, which is possible, such a dangerous current cannot reach us or our instruments, for the "automatic cut-outs" provided for the purpose will prevent its so doing.

It is not very generally known, but such, however, is the fact, that currents of a potential of even four hundred volts have been carried upon certain *bare* wires in many cities for years; and such currents have been and are now handled by telegraph operators, and never any accidents resulting therefrom.

That "in the work of the physician electro-therapeutics will not permit the use of a high potential current" is certainly a grievous mistake. They may not know it, but nevertheless it is true, that from their medical induction coils and few cells of battery they are constantly giving their patients currents of one thousand, fifteen hundred, and perhaps even *three thousand* volts, and yet they don't kill them in that way!

Apparatus are used for lighting the gas in churches, theatres, etc., by electricity, which generate currents as high as fifty thousand volts, and yet such are handled, certainly without any great care, and accidents resulting therefrom are unheard of.

From all of which we may reason that "*high potential*" and "*danger*" are not necessarily synonymous, a clearer explanation of which may be given by referring again to our comparison with hydraulics. We can readily understand how a six-

inch stream of water under a pressure of one-half pound per square inch turned upon a man at close quarters, would not greatly inconvenience him. Increase the pressure to one thousand pounds per square inch, without changing the diameter of the pipe, and the results would certainly prove disastrous. However, if we decrease the diameter of the pipe to one-one-thousandth or one-ten-thousandth of an inch, he can safely stand a pressure of ten thousand or even one hundred thousand pounds per square inch. So it is with the electric current. To be dangerous, it must not only possess a high voltage, but must also carry *volume*. The arc light wires, with their high potential currents, carry also sufficient volume to cause instant death under almost any circumstances. The Edison current (upon the street mains), and other systems of same character, though particularly large in volume, have not sufficient potential to prove dangerous under any excepting the most unfavorable and probably impossible conditions.

In this city no less than nine of our most prominent physicians having discarded their batteries are now using the current from the Edison station; and one needs only to see the difference between their "old" plants and the "new," to appreciate the wonderful improvement made.

In my own practice I have used this current over two years, operating the engine mallet, etc., and I feel morally sure that owing to the manner in which the connections are made, my patients and I are in perfect immunity from danger.

We may therefore conclude that, the proper precautions being taken, all danger is removed, and the dental profession may derive great benefit and pleasure from the use of the current as furnished from the low-tension electric light and power stations.

Yours very truly,

C. EDMUND KELLS, JR.,

April 15, 1889.

12 Dauphine street, New Orleans, La.

It was not our intention in the editorial referred to, nor in the correspondence of Dr. Grier, to lead to the belief "that the use of the electric currents under discussion must necessarily carry with them the liability at some time or other to disastrous results." On the contrary, it was distinctly stated that "the danger is not in a successful use of the current by means of properly constructed and carefully guarded instruments, but lies in the unintentional results, —the accidents, the unexpected which so often happens, *the possible transference of the current from the apparatus to the person of the operator or the patient.*" Of course we were writing with reference to the arc and alternating currents as we know them to-day, not of such modifications in their management as may be obtained in the future.

It is true that some people did object to gas being introduced in this city, but not all of them, else the pipes would never have been laid; but this allusion to Philadelphia conservatism of that period has no bearing on the point under discussion. The imaginary bad results were merely predictions, made *before* its introduction, and were not based upon actual occurrences, while our warnings as to the need of care in the dental use of the motor and light currents are the outgrowth of a knowledge of the fatal acci-



dents which have so frequently happened, and so generally, in fact, to those skilled in its manipulation and fully aware of its dangers; all of which Dr. Kells admits. What reasons could be more suggestive than those to which he attributes their occurrence,—“carelessness, and defective construction”? To call attention to these liabilities was our reason for writing upon the subject, with the design of diminishing these risks. We certainly think it imperative that all the known safeguards which electrical science has so far devised shall be employed to guard against accidents from “defective construction,” but even then the element of “carelessness” will not have been eliminated. If all dentists had the electrical skill and knowledge of Dr. Kells, and the ever-present apprehension of possible accident in addition to the careful manipulation necessarily enforced by such knowledge, we would not feel the sense of responsibility nor the necessity for the caution which we now do. It is because we positively know from every-day correspondence that many of those who wish to avail themselves of the advantages and conveniences of the electric current have neither theoretical nor practical knowledge in this direction; and while we acknowledge our incompetency to teach all that should be known by those who purpose an hourly familiarity with this tremendous energy, we feel it to be our duty to draw their attention to the possibilities of harmful accidents, in order that they may guard against them as far as possible.

Dr. Kells objects to our “passing the alternating current.” He evidently does not appreciate our position. We were not writing of motors in general use, but only of those applied to dentistry. In this respect, however, he is even more positive than we were, as he says, “But not being adapted to the electric mallet does not quite fill the bill.” We will make no objection to it should there be, as he expects to see, “within the next few years as great strides made in their perfection and exploitation as have been made in the past with the constant current motor.” We will gladly welcome it, and any other safe and available source of power, as a desirable addition to the dentist’s armamentarium. The same may be said of the arc-light circuit, but we are only concerned with that which to-day promises the best and safest method.\*

In passing, with reference to the safety of the alternating current, we may call attention to the conclusions arrived at after the experiments recently made in New York to determine which form of the electric current was most effective in the execution of criminals as required by a recent enactment in that State. The alternating cur-

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\*See *Electrical Engineer*, December, 1888, p. 594, and February, 1889, p. 74, in relation to dangers of alternating currents.

rent was selected as being the most rapidly fatal, and at a late test made on animals of various weights and sizes, from 200 to 280 volts were found to be quite sufficient to destroy life.

Dr. Kells kindly adds a clearer explanation to our comparison with hydraulics. He says, "We can readily understand how a six-inch stream of water [volume] under a pressure of one-half pound per square inch [potential or voltage] turned upon a man would not greatly inconvenience him; increase the pressure [voltage] to one thousand pounds per square inch, without changing the diameter of the pipe [volume], and the results would certainly prove disastrous." (The interpolations are our own.) Here we are in hearty accord with the illustration, as it shows the point we wish to make. A higher potential increases the danger of a given volume, and it should be remembered that our remarks referred only to such currents as are practically available for the dental motor,—currents of at least 110 volts and three ampères. Such currents as Dr. Kells speaks of as being used by physicians in their medical induction coils are of no use for dental motors. They are usually secondary currents, produced by the proximity of a secondary coil to one carrying a current of extremely low volume and electro-motive force, which is generally derived from one or two small battery cells. This current is modified by a rapid interruption of the primary current giving rise to a succession of shocks of infinitesimal duration, not having power enough to deflect a delicate galvanic needle, but having a high electro-motive force, which, while it will not kill, may readily be made so intensely painful as to be unendurable by the strongest man.

Let us consider, then, what are the danger elements in the use of electricity. It is not the volts which kill, but the ampères. The volts are required to force the ampères into the human body; the latter do the deadly work. A remembrance of this fact will render clear many statements which would otherwise seem contradictory. An Edison circuit carrying hundreds of ampères can be handled with impunity; there is not sufficient voltage or pressure to force into the body a current capable of doing harm. On the other hand, a current from a medical battery or Holtz electric machine, though sometimes very painful, can also be taken without danger. In this case the volts may be one or many thousands, and the whole current be passed through the body, but the current is so small that no harm ensues. In the arc-light current both the ampères and the volts are in quantity far above the danger-point, ready to do their deadly work at any moment.

In the alternating current the voltage of the wires brought into the building is doubtless insufficient to cause death, but this current

is obtained from a primary current even more deadly than the arc, through the intervention of an apparatus called a converter; and the safety of the user depends entirely on the insulation of the wires in the converter, in which they approach each other closely. The safety is in the care which some unknown workman has given to the construction of the converter.

Any consideration of voltage must always be in connection with the ampèrage of the current employed. The lowest of the currents under consideration, as in the Edison, is three ampères, and not one-one-thousandth of an ampère, as in the medical induction apparatus referred to.

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### POST-GRADUATE INSTRUCTION.

THE Chicago Dental College has initiated a "practitioners' course" of four weeks' attendance in the month of April, and the class, consisting of thirty-four practitioners from nearly every State of the Union, have expressed in unanimous resolutions their belief that a like course in other colleges "will meet with the cordial indorsement of the dental profession throughout the country." A "practitioner's certificate" is given by the college, but of its form or character we are unadvised.

This pioneer class has organized as "The Post-Graduate Dental Association of the United States." President, Dr. J. M. Gallehugh, Chenoa, Ill.; vice-president, Dr. R. B. Fuller, Chicago, Ill.; treasurer, Dr. Hamlin Barnes, Wellsville, Ohio; secretary, Dr. C. W. Crawford, Spencer, Ia.

There has also been organized "The Chicago Post-Graduate School of Prosthetic Dentistry and Dental Laboratory." President, Dr. L. P. Haskell; secretary and treasurer, Dr. M. Stout.

These several and distinct endeavors to bring dentists together for the systematic study of dentistry appear to be the natural outgrowth of the clinical demonstrations of society meetings, and are thus significant of the lines of true progress in the actual practice of the profession. We look for great results to follow these beginnings of post-graduate organizations.

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### DENTAL COLLEGES AND SOFT FOIL.

THE remarks of Dr. Cook in the report of the New York Odontological Society, pages 366 and 367 of the May Cosmos, have moved several graduates of various dental colleges to send us communications averring that the professors gave them thorough instructions in the use of soft foil, and in the manipulation of napkins and



bibulous paper for keeping the teeth dry. We thank our correspondents for the information they have been kind enough to furnish, and for lack of space for their communications in full we condense them into this general denial that such instruction is lacking in the teaching of operative dentistry in American dental colleges.

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### CORRECTION.

IN the paper by Dr. Comegys, on "Gum-Colored Porcelain Fillings," page 354, fifteenth line, of our May number, for "Thompson" read "Thomas," referring to the method presented to the meeting of the Chicago Dental Society by Dr. Thomas, of Des Moines, Iowa.

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### MINNESOTA'S NEW DENTAL LAW.

HEREWITH we present the text of the new dental law for the State of Minnesota, which recently passed the legislative bodies and subsequently received the signature of the governor.

As will be seen, this law presents some new features, and is in some respects more stringent than the law of 1885 which it supersedes, or than those which have heretofore been adopted in the several States. It requires *both* a diploma of graduation from a dental school in good standing and submission to an examination before the State board of examiners, with practical clinical demonstration. All practitioners in the State are required to register, and new applicants who have been in practice for ten years prior to the date of the passage of the act are admitted to examination before the board without a diploma. Provision is made for the payment of an annual license fee of one dollar, and also under certain conditions for the forfeiture of a license already granted. It has been the earnest endeavor of the projectors of the law to furnish some additional safeguards against charlatanry and incompetency, and it is believed that its practical application will result in much improvement in the status of dentistry throughout that State.

The law, which is entitled "An act to regulate the practice of dentistry in the State of Minnesota," and which goes into effect on the 1st of September next, reads as follows:

*Be it enacted by the Legislature of the State of Minnesota :*

SECTION 1. From and after September 1, 1889, it shall be unlawful for any person to practice dentistry in this State, unless he shall have first obtained a certificate of registration thereto, and filed the same or a certified copy thereof with the clerk of the district court of the county of his residence, all as hereinafter provided.

SEC. 2. A board of examiners to consist of five resident practicing dentists is hereby created, whose duty it shall be to carry out the purposes and enforce the

provisions of this act. The members of the first board under the provisions of this act shall consist of the members of the present board of dental examiners, existing under chapter 199 of the General Laws of 1885, who shall hold their offices as members of such new board for the term for which they were appointed under said former act, and until their successors are duly appointed. All vacancies in said board shall be filled by appointment by the governor as hereinafter provided. The term for which members of said board shall be appointed shall be three years, and until their successors shall be duly appointed. It is also hereby provided that no person shall serve to exceed two terms in succession. In case of any vacancy occurring in said board in the term of any member of said board, such vacancy shall be filled for such unexpired term by the governor from names to be presented to him within two months of the occurrence of such vacancy by the Minnesota State Dental Association in the same manner as hereinafter provided. It shall be the duty of said Minnesota State Dental Association after September 1, 1889, annually prior to August 10, to present to the governor the names of twice as many practicing dentists resident in this State as there are regular members to be appointed of said board prior to September 1, in the following year. All appointments by the governor shall be made within twenty days of the submission of such names to him, and if such names shall not be submitted to him within the allotted time, he shall make his appointments within twenty days from the expiration of the time allotted for such presentation of names from among the resident practicing dentists. *Provided*, That nothing in this act shall prevent the appointment of two members of said board from among the resident practicing dentists not members of said Minnesota State Dental Association, if the governor shall so elect.

SEC. 3. Said board shall choose at its first regular meeting, annually, one of its members president and one secretary thereof, who severally shall have the power during their term of office to administer oaths and take affidavits, certifying thereto under their hand and the seal of the said board. And after September 1, 1889, said board shall meet regularly at least twice in each year, to wit: On the first Tuesday in April and October, and at such other times as may be deemed necessary by the board. Such meetings shall be held at the medical department of the University of the State of Minnesota. A majority of said board shall at all times constitute a quorum and the proceedings thereof shall at all reasonable times be open to public inspection: And it is furthermore provided, that in the event of any member of said board absenting himself from two of its regular meetings consecutively, the board shall declare a vacancy to exist, which vacancy shall be filled by the means hereinbefore provided.

SEC. 4. It shall be the duty of the first board hereinbefore provided for to meet at the city of Duluth, in said State, on the second Tuesday in July, 1889, and elect officers, and within ten days thereafter to transfer to a register to be provided by them for that purpose the name, residence, and place of business of each and every person who on the second Wednesday in July, 1889, and pursuant to an act of the legislature of the State of Minnesota, approved March 3, 1885, shall be qualified to practice dentistry in the State of Minnesota, and who shall then be duly registered on the books of the board created by said act of March 3, 1885. No certificates of license to practice dentistry shall be issued after the second Wednesday in July, 1889, under said act of March 3, 1885. It shall be the duty of the said secretary of the first board hereby created to send to each person so registered prior to August 5, 1889, a certificate of his enregistration signed by the president and secretary of such board of examiners.

SEC. 5. Any person or persons who shall desire to begin the practice of dentistry in the State of Minnesota on and after September 1, 1889, shall file his name, together with an application for examination, with the secretary of the State Board of Dental Examiners, and at the time of making such application shall pay to the secretary of said board a fee of ten dollars, and shall present himself at the first regular meeting thereafter of said board to undergo examination before that body. In order to be eligible for such examination such person shall present to said board his diploma from some dental college in good standing, and shall give satisfactory evidence of his rightful possession of the same, provided also that the board may in its discretion admit to examination such other persons as shall give satisfactory evidence of having been engaged in the practice of dentistry ten years prior to the date of passage of this act. Said board shall have the power to determine the good standing of any college or colleges from which such diplomas may have been granted. The examinations shall be elementary and practical in character, but sufficiently thorough to test the fitness of the candidate to practice dentistry. It shall include, written in the English language, questions on the following subjects: Anatomy, physiology, chemistry, materia medica, therapeutics, metallurgy, histology, pathology, operative and surgical dentistry, mechanical dentistry, and also demonstrations of their skill in operative and mechanical dentistry. All persons successfully passing such examinations shall be registered as licensed dentists in the board register provided for in section 4, and also receive a certificate of such enregistration, said certificate to be signed by the president and secretary of the board. The examination fee shall in no case be refunded.

SEC. 6. Recipients of said certificate of enregistration shall present the same for record to the clerk of the district court of the county in which they reside, and shall pay a fee of fifty cents to said clerk for the registration of the same. Said clerk shall record said certificate in a book to be provided by him for that purpose. Any person so licensed removing his residence from one county to another in this State, before engaging in the practice of dentistry in such other county shall obtain from the clerk of the district court of the county in which said certificate of registration is recorded a certified copy of such record or else obtain a new certificate of registration from the board of examiners, and shall, before commencing practice in such county, file the same for record with the clerk of the court of the county to which he removes, and pay the clerk for recording the same the fee of fifty cents. Any failure, neglect, or refusal on the part of any person holding such certificate or copy of record to file the same for record as hereinbefore provided, for six months from the issuance thereof, shall forfeit the same. Such board shall be entitled to a fee of one dollar for the reissue of any certificate, and the clerk of the district court for any county shall be entitled to a fee of one dollar for making and certifying a copy of the record of any such certificate.

SEC. 7. All persons shall be said to be practicing dentistry within the meaning of this act who shall for a fee or salary, or other reward paid either to himself or to another person for operations or parts of operations of any kind, treat diseases or lesions of the human teeth or jaws or correct malpositions thereof. But nothing in this act contained shall be taken to apply to acts of bona fide students of dentistry done in the pursuit of clinical advantages under the direct supervision of a preceptor or a licensed dentist in this State, during the period of their enrollment in a dental college and attendance upon a regular uninterrupted course in such college.

SEC. 8. Out of the funds coming into the possession of the board the members



of said board may receive, as compensation, the sum of five dollars for each day actually engaged in the duties of their office, and mileage at three cents per mile for all distance necessarily traveled in going to and coming from meetings of the board. Said expenses shall be paid from the fees and assessments received by the board under the provisions of this act, and no part of the salary or other expenses of the board shall ever be paid out of the State treasury. All moneys received in excess of said per diem allowance and mileage as above provided for shall be held by the secretary of said board as special fund for meeting expenses of said board and carrying out the provisions of this act, he giving such bond as the board shall from time to time direct. And said board shall make an annual report of its proceedings to the governor by the 15th of December of each year, which report shall contain an account of all moneys received and disbursed by them pursuant to this act.

SEC. 9. Any person who shall violate any of the provisions of this act shall be deemed guilty of a misdemeanor, and upon conviction may be fined not less than twenty dollars nor more than one hundred dollars, or to be confined not less than one month nor more than three months in the county jail, or both. And all fines thus received shall be paid into the common school fund of the county in which such conviction takes place.

SEC. 10. Any person who shall knowingly or falsely claim or pretend to have or hold a certificate of enregistration, diploma, or degree granted by a society or by said board, or who shall falsely and with the intent to deceive the public, claim or pretend to be a graduate from any incorporated dental college, not being such graduate shall be deemed guilty of a misdemeanor, and shall be liable to the penalties provided in section nine of this act.

SEC. 11. Justices of the peace and the respective municipal courts shall have jurisdiction over violations of this act. It shall be the duty of the respective county attorneys to prosecute all violations of this act.

SEC. 12. Any person who shall be licensed under the provisions of this act, and who shall practice dentistry under a false name with intent to deceive the public, shall be liable to have said license revoked upon twenty days' notice of such proposed revocation, and of the time and place of considering such revocation by order of the State Board of Dental Examiners. And any person who, after revocation of his license, shall continue to practice dentistry in the State of Minnesota shall be deemed guilty of a violation of the provisions of this act and shall be subject to the penalties provided therein. Nor shall a certificate to a person under one name be any defense to an action brought against him for practicing without a certificate under another, unless it be shown that such practice under such other name was done without intent to defraud or deceive.

SEC. 13. Every registered dentist shall in each and every year after 1889 pay to said board of examiners the sum of one dollar as a license fee for such year. Such payment shall be made prior to May 1 in each and every year; and in case of default in such payment by any person, his certificate may be revoked by the board of examiners upon twenty days' notice of the time and place of considering such revocation. But no license shall be revoked for such non-payment if the person so notified shall pay before or at such consideration his fee and such penalty as may be imposed by said board, provided that said board may impose a penalty of five dollars and no more on any one so notified as a condition of allowing his license to stand. Provided further that said board of examiners may collect any such dues by suit.

SEC. 14. The board of examiners created by this act may sue or be sued, and

in all actions brought by or against it it shall be made a party under the name of the Board of Dental Examiners of the State of Minnesota. And no suit shall abate by reason of any change in the membership of said board.

SEC. 15. Chapter 199 of the General Laws of 1885, being an act entitled "An act to insure the better education of the practitioners of dental surgery, and to regulate the practice of dentistry in the State of Minnesota," approved March 3, 1885, is hereby repealed, such repeal to take effect September 1, 1889.

SEC. 16. All effects and property whatsoever of the board of dental examiners created by said act of March 3, 1885, shall on said first day of September, 1889, be and become the property of the board of examiners created by this act, and said board hereby created is hereby declared to be the legal successor of the board created by said act of March 3, 1885.

SEC. 17. This act shall take effect and be in force from and after its passage.

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## BIBLIOGRAPHICAL.

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**DENTAL MEDICINE:** A Manual of Dental Materia Medica and Therapeutics. By FERDINAND J. S. GORGAS, A.M., M.D., D.D.S., Professor of the Principles of Dental Science, Dental Surgery, etc., in the University of Maryland, Baltimore. Third Edition, revised and enlarged. Octavo, 430 pp. and index. Philadelphia: P. Blakiston, Son & Co., 1889. Price, cloth, \$3.50.

The two former editions of "Dental Medicine" have been noticed with approval in the DENTAL COSMOS as they appeared. Their exhaustion in so short a time is evidence of the favor with which the book was received. The present volume contains nearly one hundred pages of new matter. An improvement has been made in the arrangement of a portion of the subject-matter, and considerable additions have been made to a number of the topics. Quite a number of medicinal agents with dental uses have been added, and also new formulæ. We can repeat with emphasis the commendation of former editions, and the claim that as an educator and as a work of reference it should be in the hands of every student and every practitioner of dentistry.

**ELEMENTS OF HISTOLOGY.** By E. KLEIN, M.D., F.R.S., Lecturer on General Anatomy and Physiology in the Medical School of St. Bartholomew's Hospital, London. Illustrated with 194 engravings. New and enlarged edition. 12mo, pp. 357 and index. Philadelphia: Lea Brothers & Co., 1889. Price, cloth, \$1.75.

This standard treatise on histology is too well known to require description. The present edition includes a record of the progress in histology to date, and the results of many valuable and exact observations. Several new illustrations have been added, and some of those of previous editions have been replaced by more satisfac-

tory ones, including a number which the author believes to be the only really good histological micro-photographs that have as yet been published in any text-book. The chapters upon the teeth, the salivary glands, and the mouth, pharynx, and tongue will be esteemed of especial interest by advanced dental students.

**HYGIENE OF THE NURSERY**, including the general Regimen and Feeding of Infants and Children, and the Domestic Management of the Ordinary Emergencies of Early Life. By LOUIS STARR, M.D., Clinical Professor of Diseases of Children in the Hospital of the University of Pennsylvania. Second Edition, with 25 illustrations. 12mo, 280 pp. Philadelphia: P. Blakiston, Son & Co., 1889. Price, cloth, \$1.00.

The first edition of this work was exhausted within six months of the date of publication. In this new edition the work has been revised, improved, and enlarged. The hygiene of the nursery is considered in ten chapters, embracing the topics upon which all intelligent mothers should be informed. It is free from technicalities, and the teachings are fairly within the comprehension of ordinary intelligence. It is an admirable condensation of hygienic rules applicable to infancy, attention to which would save many young lives.

#### PAMPHLETS RECEIVED.

Concerning Trusts. Read at a meeting of the Philadelphia Social Science Association, February 21, 1889, by Prof. Robert Ellis Thompson. Published by the Association, 720 Locust street, Philadelphia.

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## OBITUARY.

### MR. ROBERT HOGUE, DENTIST.

THE death of this venerable man, which took place April 1, at his residence in Edinburgh, Scotland, at the advanced age of ninety-seven, removes from the world one who has done noble service for the profession. As the son of a Presbyterian minister in Kelso, where he was born December 6, 1792, he received a good elementary education, and from a boy had a taste for the use of tools, and all artistic and mechanical appliances. He studied for a short time in London with an uncle who practiced the art of dentistry there; but as there were no schools and few appliances for teaching the science or art of odontology in those days, Mr. Hogue had to teach himself in nearly every branch, succeeding so well that after settling in Edinburgh he gained a large and lucrative practice.

Dr. Hogue was among the first, if not the first to make mineral



teeth. The dental profession, which has now reached such large dimensions, has been indebted to him for not a few of the appliances and operations which are now the commonplaces of the art, and a good many of the numerous instruments which are to-day seen in every dentist's tray owe their origin, or some marked improvement in their form, to the knowledge of tools and how to use them which he possessed. He retired from active professional life about twenty years ago, and was succeeded by his son, D. W. Hogue, M.D., D.D.S. Another son, Dr. T. W. Hogue, is in practice in Bournemouth, England.

Drs. D. H. and J. Goodwillie, of New York City, are his nephews.

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#### DR. HENRY B. NOBLE, JR.

DIED, at Washington, D C., April 19, 1889, H. B. NOBLE, JR., D.D.S., in the twenty-eighth year of his age.

Dr. Noble was a graduate in medicine of the Columbian University at Washington, and also in dentistry at the University of Pennsylvania in the class of 1884. He was a prominent member of the Washington City Dental Society, being at one time president of that organization, which recently passed resolutions of respect to his memory.

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#### EVLYN E. CROFOOT, D.D.S.

DIED, in Hartford, Conn., April, 1889, EVLYN E. CROFOOT, D.D.S., in the seventy-eighth year of his age.

Dr. Crofoot was in the active practice of dentistry for over fifty years, the major part of that time in Hartford, Conn. He made a considerable reputation in prosthetic dentistry, and his services were sought by the better class of citizens. Dr. Coffin, of London, Eng., and Dr. Hall, of Nice, France, were formerly students in his office. Dr. Crofoot was the last of the old-school practitioners in Hartford, among whom were Drs. Wells, Preston, Parmele, and Riggs, all of whom honored their calling in more than an ordinary degree.

GEORGE A. MILLS.

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#### MARIA A. BURCH, D.D.S.

DIED, in San Francisco, Cal., December 13, 1888, of typhoid malarial fever, MARIA A. BURCH, D.D.S., in the twenty-seventh year of her age.

Miss Burch commenced the study of dentistry under the preceptorship of Dr. S. W. Dennis, and was among the first to matriculate at the Dental Department of the University of California, graduat-

ing with the class of 1883. She was the first graduate to commence practice on the Pacific coast, and won an enviable reputation for the excellent character of her work. She was much esteemed in professional and social circles.

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## PERISCOPE.

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**EMPHYEMA OF THE MAXILLARY SINUS.**—The maxillary sinus is a cavity of the shape of a triangular pyramid, with the base towards the nose and apex towards the malar bone. In children it is very small, and in adults it varies much in size, even in the same person. It can contain from one to eight drachms of fluid. The sinus communicates with the nasal cavity in the middle meatus,—that is, between the middle and lower turbinated bones. The maxillary foramen, as we will call it, together with the frontal foramen or opening of the frontal sinus, form the so-called infundibulum. This is an oval aperture, of about the size of a small lentil, in the mucous membrane of the middle meatus, just under the center of the middle turbinated bone. It lies between the uncinate process and the ethmoidal bone. The osseous aperture—that is, the opening formed by bony structures alone—is much larger, and partly covered by mucous membrane. Behind the infundibulum, and lower down, there is very often another opening, just over the middle of the lower turbinated bone, often called the accessory foramen. It is situated between the uncinate process and palate bone, and is, like the maxillary foramen, much larger in the bony skeleton. In nine cases out of ten it is quite covered with mucous membrane. We thus see that the wall between the middle meatus and maxillary sinus is in two places composed only of mucous membrane. To this important fact we shall refer when discussing the various methods of opening the sinus.

There is great difference of opinion as to the common cause of empyema of the sinus. Heath, in his Jacksonian prize essay on "Injuries and Diseases of the Jaw," 1867, and again in the *British Medical Journal* of June, 1887, says, "Suppuration in the antrum is ordinarily the result of inflammation, extending from the teeth to the lining membrane of the cavity. Other causes besides diseases of the teeth have been known to induce suppuration in the antrum, such as a violent blow on the face. It is possible also that the disease may result from catarrhal or other inflammation of the lining membrane, and it has been excited by the entrance of foreign bodies." No doubt, in some cases, especially in the acute cases, the disease may spread from the teeth, but in the majority of cases it seems to me that the empyema is caused by the inflammatory processes, which pass directly from the mucous membrane of the nose to that of the maxillary sinus. This inflammation of the sinus often spreads to the alveolar process and causes disease of the teeth. This fact has given rise to the general and erroneous idea that the diseased teeth cause the disease of the sinus. In four cases of empyema which I have had the opportunity of seeing and treating in the last few months, there was in every case a distinct history of previous

affection of the mucous membrane of the nose, and in not a single case was the empyema caused by diseased teeth. In two cases there was no history of diseased teeth whatever. In one case there were several diseased teeth and much toothache. The latter was relieved after treatment of the empyema, but not by removal of the teeth. In one case there was atrophy of the alveolar process, the teeth became loose, and dropped out without the least pain.

The symptoms of empyema are in acute cases very evident and easy to recognize. In chronic cases, however, the symptoms are often very obscure indeed, and the disease is very frequently overlooked. Generally, the patients complain of dull aching pain over the cheek, often of toothache (this is a very common complaint), of megrim, and of an offensive discharge which passes from the nose, especially if the head is bent down, or from the posterior nares into the mouth and throat. Sometimes there are no definite symptoms whatever, and we simply have a chronic purulent or hypertrophic rhinitis. If these affections often recur in spite of treatment, and especially if they are unilateral, there is sure to be some disease of the maxillary sinus, or more rarely of the ethmoidal cells. Just as in cases of one-sided recurrent conjunctivitis we ought always to look out for an affection of the lachrymal sac, so ought we in cases of one-sided recurrent rhinitis to look out for an affection of the maxillary sinus.

As regards treatment, there is, from a surgical point of view, only one method: to let out the pus, and syringe and drain the sinus till there is no more abnormal secretion there. If the pus should point at any place, of course let it out there. In ordinary cases, the sinus can, roughly speaking, be opened from the nose (middle or lower meatus) or from the mouth (canine fossa or alveolar process). The former method—*i.e.*, to open the sinus from the interior of the nose—seems to me to be vastly superior to any other. Hartmann of Berlin, and Stoerck of Vienna, advocate the method of syringing out the sinus from either of the natural foramina in the middle meatus, and, if these be not large enough, to enlarge them. We have seen that the wall separating the middle meatus from the sinus is very thin and partly composed of mucous membrane only, which in many cases of diseases of the nose is often absent, thus leaving a large and free opening between the nose and the sinus. For syringing out the sinus a common Eustachian catheter or small silver bent tube can be employed. The patient feels the fluid passing into the sinus, so that one can be sure when the proper opening has been reached. The advantages of this method are that (1) it is the most natural way of syringing the cavity, as no new opening has to be made; (2) it is very simple, and (3) not at all painful. The disadvantages are that (1) the opening is high up in the sinus, and it is therefore rather difficult to drain and syringe out properly; and (2) the nostril is often very narrow, so that it is difficult to introduce an instrument. Mikulicz, of Krakau, proposes to open the sinus by perforating the bony wall between it and the lower meatus, just under the middle of the lower turbinated bone.\* He uses a special instrument for the purpose. He holds this method to be

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\* Archiv für Klinische Chirurgie, xxiv, 3, page 626.



superior to the method advocated by Hartmann and Stoerck for the following reasons: (1) The opening is lower down in the sinus than the natural opening, and it is therefore easier to drain the cavity through this opening; and (2) there is not so much danger of wounding the orbit. In opening the sinus from the alveolar process, the first or second molar tooth is removed, if necessary, and a thick trocar or probe is passed through the socket into the sinus. The advantages of this method are: (1) The sinus is opened at its lowest part, and can therefore be drained and syringed very efficiently; (2) the field of operation can be overlooked. The disadvantages are (and these seem to me to be very great): (1) The pus, etc., pass out into the mouth, giving rise to much nausea, sickness, etc.; (2) the opening readily closes up; (3) foreign bodies, especially particles of food, easily get into the sinus and keep up the suppuration; (4) the alveolar process is often very thick and hard to pierce; (5) there is danger of wounding the orbit; (6) a sound tooth has often to be removed; (7) a cavity is made to communicate with the mouth, which nature intends to communicate with the nose only; and (8) the operation is very painful, and an anesthetic is generally necessary. The mode of treatment I should propose would be: (1) If pus points anywhere, open the sinus at that place; (2) in all other cases try and make use of or enlarge the normal opening in the middle meatus; (3) if this cannot be done, operate as proposed by Mikulicz. The alveolar process should, I think, be perforated only (1) in very acute and painful cases; (2) if the nostril be narrow and there be not room enough to introduce an instrument; and (3) if the first or second molar tooth be loose, and pus flows freely from the socket, etc., on its removal.

The points to which I have endeavored to draw attention are: 1. That the chronic form of empyema of the maxillary sinus is much more common than is generally supposed. 2. That in many cases there are no typical symptoms whatever. 3. That empyema is very frequently the cause of chronic and recurrent rhinitis, especially unilateral. 4. That empyema can give rise to the typical symptoms of ozena. 5. That it is in most cases caused by disease of the mucous membrane of the nose, and not by diseased teeth. 6. That in most cases the easiest and simplest method of treatment is to open the sinus from the interior of the nose, and not from the alveolar process.—*Adolph Bronner, M.D., in The Lancet.*

**THE TREATMENT OF CLEFT PALATE.**—Drs. G. F. Grant, D.D.S., and H. A. Baker, D.D.S., presented a paper on "The Treatment of Cleft Palate," referring to the history of the use of artificial appliances in the treatment of this deformity, and exhibiting the apparatus and patients wearing it.

Drs. Charles B. Porter and J. Collins Warren opened the discussion in reference to the value of surgical interference.

Dr. G. F. Grant referred to twenty-one years' experience in the treatment of cleft palate by mechanical appliances, beginning just after the appearance of a paper by William Suerßen, of Berlin, in 1867.

The results of surgical operation are unsuccessful because (1) under the most favorable conditions there is no union of the divided

palate; (2) there is not so much improvement in speech as was hoped; (3) there is an increased difficulty in the adjustment of, and mechanical appliances afterward.

In 1873 and 1874 this subject was occupying the attention of Drs. Bigelow, Warren, Hodges, and Cabot. At this time Dr. Grant had his first success with a mechanical appliance, in the case of a patient fourteen years of age, in whom Dr. Warren advised no operation, but an artificial plate. After its application there was a noticeable improvement in speech directly, and there was a gradual increased improvement for a year, when it was very marked. For the last ten years the patient has been a teacher in the public schools of one of the large towns in Massachusetts.

Since 1871, Dr. Grant has treated one hundred and fifteen cases of congenital fissure, with the result justifying the conclusion that there is no reasonable doubt as to the success of the appliance. After the use of an appliance the whole system of speech is so changed that it is always retained, even on removal of the appliance, and thus the patient can form his words better than he did before he had the appliance introduced.

Dr. Grant thinks that the importance of the constrictor laryngeus muscle in the treatment of these cases is overestimated. According to his experience, the appliance can be adjusted with success as early as the seventh year of age. He emphasized the importance of a proper operation on the hare-lip, which generally accompanies the defect of the palate, so as to secure the greatest mobility, since a short and inflexible lip-wire interferes with the articulation and the obtaining a cast of the condition.

In illustration, Dr. Grant exhibited a patient for whom he had adjusted an appliance. His replies to questions from the members of the society, as well as his reading both with and without the appliance, testified to the great improvement in his speech.

Dr. H. A. Baker said that the first mechanical appliance adjusted and worn successfully in a case of fissure of the palate was that devised and manufactured in 1841 by Dr. Stearns, a physician, for himself. His apparatus was very complicated and had many springs. Moreover, he did not select a permanent material. Soft vulcanized rubber, which he used, has a life of only two and a half or three months to a year.

In 1860, Dr. Norman W. Kingsley simplified Stearns's apparatus and used metal instead of wooden molds in its construction, thus securing a smoother result with a better finish.

In 1867, William Suersen, of Berlin, used permanent materials of hard rubber, and his obturator had a posterior wing going to the posterior pharyngeal wall, which was closed by the muscles.

In 1881, Dr. Baker made his first successful appliance, and since then he has had upwards of a hundred cases. This apparatus was made of hard rubber, and had hinges to aid the levator muscles in bringing it up to the posterior pharyngeal wall. The patient was twelve years of age, and the operation of staphylorrhaphy had been performed unsuccessfully. The plate was made eight years ago, and some improvement in speech was noticed at once, and after training as to the proper way of using the lips and tongue there was much more and faster improvement.

In illustration Dr. Baker exhibited several plaster models with the appliances in position, as well as two patients, who showed a marked improvement in speech when wearing the appliance.

Prof. Butterfield stated that he had been a teacher of persons afflicted with vocal defects for the last eighteen years, and that in connection with the various phases of stammering, stuttering, etc., he was brought into association with persons with defective palates. After the adjustment of a plate, some people will develop the best they can do instinctively and intuitively, while others will not adapt themselves to its use for a long time. A person with a musical mind will at once seize upon the vibrations of the voice and adapt them intuitively. The professor believes there exists a condition, which may be called sound-deafness as compared to the term color-blindness, and thus it is that people learn so very differently. He then referred to Bell's visible speech, which consists of a system of phonic symbols, by means of which one may learn to speak correctly even unknown languages; he himself had been tested in thirty different languages. When a person with fissure of the palate has a plate introduced, he must learn what the ear never found in his own voice. It is only necessary to learn the proper position of the organs. It is much more difficult to learn to get a good quality of voice than to articulate, for this is dependent on the relative position of the cavities. It is most difficult to wake up a response in the anterior cavities of the nares. Unity of sound is due to vibrations in all of the cavities in unity.

Dr. Charles B. Porter said that he came forward, not as an opponent of the views that had been advanced, but because he believed that the time has come to review the subject of staphylorraphy, which now is so rarely performed. He wished to consider it from several stand-points.

1. Is the operation feasible, and in what cases? Trelat says that the operation should be performed in any case unless the extent of the fissure is too great, unless there has been previous operation, or unless the parents object.

2. At what age? Many authorities were quoted, some giving the age as early as fourteen months and others not until sixteen years. Dr. Porter's own idea would be at the age when the child has sufficient teeth to support a diaphragm to keep the pressure of the tongue away from the wound.

3. The method of operation. This would be comparatively simple, *e.g.*, refreshing the edges; lifting away from the bone the mucous membrane with the periosteum by means of a periosteum elevator; and putting in stitches every quarter of an inch. The sutures may be of silk or of silver wire. Lateral incisions parallel to the line of union will relieve tension. A diaphragm should be inserted to protect the stitches from the tongue.

4. Subsequent training in the formation of the voice is the most important of all things, and without it there can be no success.

Dr. Porter has operated upon two cases: one at fourteen months which did well until about the sixth day, when the mother of the child gave it a hard crust of bread and the stitches were pulled out. The other case was aged sixteen years. Nine sutures were introduced, and these were protected by a gutta-percha diaphragm. This



case did well and was exhibited. There was a great improvement in speech.

Dr. J. Collins Warren said that no operations for staphylorraphy were done previous to this century. In the early part of the century Rue began to do the operation. Later it was done by Dr. John Warren, Dr. Bigelow, Dr. Gay, Dr. Mason Warren, and others. Dr. Mason Warren (the speaker's father) did a great many operations, having modified the method. The difficulty was in the retention of the soft parts, owing to the peculiar obliquity of the bony parts. Dr. Warren seized the uvula with a pair of long forceps and drew it firmly across the fissure, when the posterior pillars became tense. Then with a strong pair of curved scissors he divided *all* of the tense tissues, whether muscles or not, after which it hung loose, and the same thing was then done on the other side. With the hard palate the difficulty was to bring the surfaces together. The edges were pared with a pointed, double-edge knife, and the mucous membrane was separated almost to the alveolar process, after which it was united by sutures. Dr. Warren did about one hundred operations. Later he did not attempt to unite the entire length of the fissure, believing that the chief essential is the restoration of the arch with enough soft palate for a valve.

Dr. Warren showed the case of instruments with which Dr. Mason Warren had performed all of his operations, upwards of one hundred in number. The sutures he used were silk, which had been soaked in the compound tincture of benzoin, which was claimed by some to have antiseptic properties, but the chief advantage was that the knot would not slip.—*Report Suffolk District Med. Soc., in Jour. Amer. Med. Assoc.*

ANESTHETICS IN DENTAL PRACTICE.—In the *Journal* of March 2 we noticed editorially a case of death from chloroform in a dentist's chair. Dr. J. C. Reeve, of Dayton, Ohio, has kindly sent us the October, 1888, number of the *Dental Register*, containing an article on "Anesthetics in Dental Practice" from his pen, which, on the subject of anesthetics, is one of the ablest in the profession. Dr. Reeve says, "There is no professional duty I perform so unwillingly as that of administering an anesthetic for dental purposes, no fee that I consider so hardly earned as that which I receive for this service. At the same time I am frequently giving anesthetics for general surgical purposes without hesitation and without undue anxiety." Again he says, "Are anesthetics more dangerous in dental practice than in general surgery? The answer must be unqualifiedly in the affirmative. Without attempting to collect statistics, take only those of the Royal Medico-Chirurgical Society and those of Sanson.\* The one gives eight cases of death under tooth-drawing out of one hundred of all operations, and the other twelve out of one hundred and seven. Here then is nearly ten per cent. of all the deaths occurring in dental operations. But this statement alone gives no just idea of the relative mortality. This could only be accurately ascertained if the total number of administrations in all surgical operations was known. Certainly anesthetics are adminis-

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\* On Chloroform. London, 1865, page 69.

tered for general surgical purposes hundreds of times for once in dental practice, and if so, then the relative number of deaths under tooth-drawing is enormously large. The causes of the high rate of mortality during this particular operation are not far to seek. I do not believe that the entrance of blood into the air-passage is very important. Several deaths, however, have been caused by an extracted tooth falling into the larynx, without doubt due to the position of the patient. Anesthetics should never be administered unless the patient be recumbent. This is not, however, in my opinion a very potent factor, and was fully considered in the paper. Another is the particular nerve involved in the dental operation, the acute pain caused by injuries to it, and the powerful effect of sudden impressions upon its branches upon the great and vital processes of respiration and circulation. By sudden impressions upon this nerve more than any other is that inhibition of the heart's action brought about which is sudden death. Far more important than all, however, is the fact that the induction of anesthesia for tooth-drawing is likely to be incomplete, and will pretty certainly be so if the operator is also the administrator. Now it is a positive doctrine of the highest and latest authorities that such reflex actions as above given are increased under chloroform, that a state of partial anesthesia is therefore one of especial danger, and especially so if the pain produced is at once sudden and sharp.\* It is gratifying, therefore, to see that this source of danger is fully recognized by the author of the paper, although it is not emphasized as it deserves to be. There is no more seductive procedure than to give a few whiffs of chloroform for the extraction of a tooth; there is no more dangerous practice. If an anesthetic is given at all, it should be given until the patient is 'off.' There is no plainer doctrine than this connected with the subject."

Dr. Reeve wholly dissents from the doctrine that a full dose of whisky before the administration of the anesthetic secures safety. There are on record many cases of death from chloroform in which an alcoholic stimulant was given just before the fatal inhalation. In regard to bromide of ethyl, Dr. Reeve thinks it is a dangerous agent, on account of its bad record, and its marked perturbative action on the heart. He does not know of such objections to the use of nitrous oxide as will justify dentists in resorting to stronger anesthetics. The objections adduced, he says, "seem but trivial when the tremendous responsibility is considered which the dentist takes upon himself when he proceeds to administer chloroform or ether, when the awful calamity of a sudden death from these agents comes to mind."

It may be said, finally, that when a dentist administers chloroform for the purpose of pulling a tooth, he incurs a responsibility that he has no right to incur.—*Jour. Amer. Med. Assoc.*

ABSORPTION OF THE TISSUES OF THE MOUTH FROM PRESSURE.—The absorption which occasionally takes place from constant pressure upon the tissues of the mouth was well exemplified by two cases brought forward at the Odontological Society of London recently

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\*See Lauder Brunton's *Therapeutics*, and Buxton on *Anesthetics*, 1888.

by Mr. Hern and Mr. E. Lloyd Williams respectively. In the first case, the patient had been wearing a set of artificial teeth, the upper and lower of which were attached by means of springs. She had not removed these teeth from her mouth for several years, and, as a result, the lower had become buried in the floor of the mouth; it was also so twisted round as nearly to sever the anterior pillar of the fauces. There was found to be complete anesthesia of the right half of the tongue and corresponding portion of the floor of the mouth, also complete loss of the sense of taste on that side. There was no pressure on the inferior dental nerve, as sensibility was present in the skin over the chin. The plate was removed with considerable difficulty, and caused much hemorrhage. Some weeks later Mr. Hern observed a whitish cord passing across the gap in the anterior pillar of the fauces; this proved to be the gustatory nerve, and on pinching it with tweezers a tingling sensation was felt in the tip of the tongue. Nine months later sensation had partly returned in the tongue.

Mr. Lloyd Williams showed a man who had extracted two loose molars for himself, the sockets of which probably communicated with the antrum. The patient, being annoyed by the cavity, plugged it with gutta-percha, gradually increasing the size until a plug was used measuring more than an inch in diameter. The hole, however, was much larger than this, as the patient was in the habit of encircling the gutta-percha with a piece of lettuce leaf. The walls of the antrum presented in places foul ulcerated spots, which, however, speedily disappeared when an obturator was placed in the mouth and antiseptic injections were used.—*The Lancet*.

**TREATMENT OF THE ECZEMA OF DENTITION.**—According to M. E. Besnier, eczema of dentition is a reflex eczema from the face, and at times from the back of the hand and wrist, with tenderness of the gums and salivation. There are three indications in its treatment: (1) to allay the itching of the gums; (2) to control insomnia; (3) to cure the local condition. To allay the irritation of the gums, he recommends frequent touchings and frictions of the gums with a finger dipped in the following solution:

Hydrochlorate of cocaine, gr.  $\frac{5}{8}$ ;  
Bromide of potassium, gr. viiss;  
Distilled water,  
Glycerin, of each m℥. M.

To control insomnia, he employs teaspoonful doses in soup, every hour, of the following mixture:

Bromide of sodium, gr. ivss-viiss;  
Syrup of orange flowers, f℥ iss.

For the local condition he prescribes the following ointment:

Oxide of zinc, gr. cl;  
Vaseline, ℥ iv.

In addition, Besnier recommends to cover the affected regions with a mask of linen or muslin coated with gutta-percha. In some affected parts a sheet of mackintosh may be used.—*Gazette Hebdomadaire*, March 29, 1889.



**HYPODERMIC INJECTIONS OF ERGOT IN FACIAL NEURALGIA.**—Dr. J. T. Stewart writes to the *Peoria Medical Monthly*, January, 1889, that for the relief of facial neuralgia hypodermic injections of ergot are incomparably superior to either aconite or gelsemium. He says he has used it during the last six years and has only had it fail in one case, in which there was evidently organic disease. Ordinarily, he says, one injection relieves the pain permanently; sometimes two, and in one very severe and obstinate case which had gone through the hands of several physicians without relief, it required three. After the third injection the patient never had a twinge of pain. The injection was made as nearly over the seat of pain as convenient. He uses the plain extract, and has it made on purpose for hypodermic use, so that one minim represents two grains of ergot. Of this solution he uses from eight to twelve minims, blood-warm, at one injection, and without further dilution.

In order to make this treatment a success, he says two things are essential. One is, to have a fresh and pure article of ergot to make the extract from, and the other is, to have the extract reasonably fresh. If kept long, it is not only worthless, but is irritating. When properly prepared and fresh, the injection produces more or less pain for ten or fifteen minutes, and when the pain from the injection subsides the neuralgia is usually gone, and does not return.—*Medical and Surgical Reporter*.

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## HINTS AND QUERIES.

**WILL** some one please give me advice in this case? A woman about four or five months pregnant has a superior right second molar with pulp exposed. Repeated applications of arsenic have had no effect. The patient is not in condition to permit the employment of an anesthetic. I diagnose pulp-stone. How shall I proceed to destroy the pulp?—J. W.

**IMPLANTATION DATA DESIRED.**—In order to obtain and place on record a consensus of professional experience and judgment in relation to dental implantation, it is desired that dentists in this and foreign countries will kindly transmit to the chairman of Section VI of the American Dental Association the facts called for under the following specifications:

1. Implantation, date of operation, sex, age, and physical condition of patient.
2. Description of the tooth implanted. Date of extraction of the tooth. Condition of the periodental membrane. Preparation of the root by trimming or shortening. Filling-material used in the root-canal.
3. Antiseptic used in preserving the teeth for implantation and during the operation. Methods of sterilization of hands and instruments.
4. Instruments employed in the preparation of artificial socket.
5. What means were used for retaining in place the implanted teeth, and how long employed? Were antiseptic washes or dressings prescribed?
6. Subsequent history of each case to date of report, or up to the time when last seen or heard from.
7. In cases which have failed specify minutely the causes of failure, together with an exact description of the implanted tooth after its removal.
8. Give the total number of teeth implanted, the number deemed successful, and the number known to have failed.

It is earnestly requested that facts of the kind above indicated will be sent on or before the first of July next to Dr. H. A. Smith, chairman of Section VI, 128 Garfield Place, Cincinnati, Ohio.

May 20, 1889.

**A SIMPLE SEPARATOR.**—For immediately separating the teeth, I have devised the instrument shown in Fig. 1. It is made of steel on a long handle, and is applied by forcing the very thin part between the teeth, and then by a firm, slow, outward pull, accompanied by a side to side motion, the teeth are gradually spread

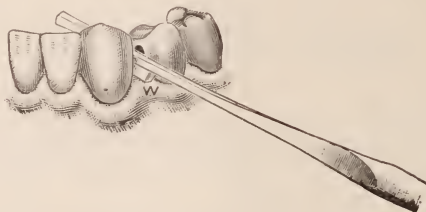
FIG. 1.



apart. The force being directed outwardly as well as laterally, the expansive power so acts as to open the arch from its inside, which is the reverse of the key-stone action of the ordinary wedge inserted from the outside of the arch, and thus a wider separation is easily obtained.

For holding the teeth apart during an operation, the ordinary wedge of wood (W, Fig. 2) is tightly inserted between the instrument and the gum; but as the space has already been made, and the sides of the two teeth are nearly or quite parallel, the wedge is not necessarily forced against the gum, thereby avoiding

FIG. 2.



the injury caused by the usual way. The instrument is then removed by pushing it inward to free its concave sides from the convex walls of the teeth.

The separator aids greatly in fixing a wedge when this is desired to remain for a subsequent operation. It is also useful in separating the teeth for thorough examination.—GORDON WHITE, Nashville, Tenn.

**SOMETHING ABOUT THE VULCANIZER.**—There have lately been quite a number of devices for the purpose of obtaining an atmosphere of pure steam in the vulcanizer. It can be done very readily in any of the vulcanizers that have the pop safety valve without any change whatever in their construction. Simply loosen the screw-cap with the wrench just enough to allow the rising steam to drive out the air, and then screw down again when certain by the escaping steam that the air is all out. It is not necessary to screw very tight, and it does not in the least interfere with the safety of the valve. Use a three-flask vulcanizer for only two flasks, or a two-flask vulcanizer for one flask. Place in the bottom a ring that will raise the lowest flask entirely out of the water. Vulcanize for one hour and twenty minutes, at 310° F., and you will have a plate that will cut like whale-bone, be light both in weight and color, and without the disagreeable smell. After vulcanizing, loosen the screw-cap to allow the steam to escape. Then open and put your flask in a bucket of water. I have my plates out of the flask in

thirty minutes from the time of turning out the gas. If you will cut a strip of sheet zinc just as wide as your vulcanizer is deep, and bend around so as to fit closely inside, you will have no more black flasks and dirty fingers, but you will have to use it several times before you get rid of the old black that is already there. Make it to fit tight so as not to pull out with the flasks.—C. E. TALBERT, Nicholasville, Kentucky.

[In the earlier forms of vulcanizers a separate chamber was provided for the flasks, which were thus subjected to the action of steam alone, and even the water of condensation was drained back into the boiler in order that the steam should be as dry as practicable. Neither our correspondent nor many of our readers are perhaps familiar with the vulcanizers of thirty years ago, but as his suggestion is in the line of reversion to what appears to be a correct, if old, mode of procedure, we spare space for its presentation.—Ed. DENTAL COSMOS.]

WASHING AMALGAMS.—I should like to tell a little of my experience. I have been experimenting with alloys for about twenty-five years, and, with one or two exceptions, I have come right around to where I first started. If I had known what I now know, it would have saved me hundreds of little experiments, as well as my time and labor; but I have learned from careful records and experiments that if you would have bright and unshrinkable fillings you should not wash nor squeeze out the excess of mercury, but if too soft add more alloy; then the formula remains the same. Many are of the opinion that alloys are useless without gold and platinum. This we regard a mistake, as a few tests, together with time, will prove. Gold and platinum are precious metals, but, as we understand them, are like many others, not altogether essential to a first-class alloy. You need not take our word for this, but keep a few records for yourself and be convinced. Nothing seems to excel the old-fashioned fillings composed of silver, tin, and copper: silver, for its edge strength, quick setting, etc.; tin, for retarding shrinkage, preserving teeth and color; copper, for its toughness, durability, and wonderful tooth-preserving qualities.

Many of our patients have fillings of twenty to thirty years' standing which they declare were composed of coin filings with a little tin foil introduced. As there was no system to regulate the amount of tin, we think some uniformity in the formula might add to its virtue.

All alloys are improved by being properly cured. What I mean is, all alloys should be allowed sufficient time to oxidize before using, as they are undergoing all sorts of chemical changes which render them for the time being unfit for use. These must come to a stand-still before amalgamation takes place. It may serve some purposes to use hot instruments, but it has been my experience that it is best not to do so.—F. H. FALES, D.D.S., Waterville, Me.

SPYER'S FORMERS AGAIN.—In the May COSMOS H. gives Dr. D. Genese's method of applying Dr. Spyer's gold formers to the plaster cast by mixing thin plaster and mucilage, and filling all the pits in the gold side of the former.

I have been using Dr. Spyer's formers for the past three years in all cases for upper and lower plates, and in many cases that promised to be worthless I have succeeded in obtaining with the formers the best results, by following the method which I will describe.

After the rubber is packed, I use a linen cloth, such as is found between the sheets of The S. S. White Dental Manufacturing Co. pink rubber, wetting the cloth and placing it between the rubber and the plaster cast, so as to prevent the rubber from sticking while being pressed, and thus allow the flask to be reopened.



This will show if there has been sufficient rubber packed, and if not, more can be added. If there should be too much rubber, it can be cut away by the aid of a warm knife. I then fit one of Dr. Spyer's formers to the cast by first cutting a slit with a pair of sharp scissors from top to center of the former, so as to allow it to bend and shape itself to the palatal surface of the plaster cast without flattening the *projections*. This done, I remove the form carefully, and coat the projections with a layer of thin plaster; then it is placed on the cast, which has previously been moistened with water so as to allow the plaster on the form to adhere to the cast, thus preventing the form from flattening while being pressed. Then the flask is closed and pressed again, when it is ready for vulcanizing.

If this method is carefully observed, I am sure that all those who use Dr. Spyer's forms, either gold or tin, will have their plates come out with the projections well and beautifully defined.—MIGUEL E. LEITER, D.D.S., City of Mexico.

RESTORATION OF ABRADED TEETH.—Under this caption, Dr. Rodriguez Ottolengui, in the DENTAL COSMOS for April, uses the following language: "Building such teeth up with gold is too formidable an undertaking. Not one man in a hundred would do such work expecting to see it intact five years later." Permit me to say that I have seen plenty of cases where such work was done three times five years ago, and it is intact to-day. I can refer to cases in which I built up or restored as many as fourteen teeth in one mouth, in the autumn of 1874, and, with the exception of one tooth, the crowns have not been touched since except to polish off the roughened gold. The one tooth referred to has been repaired but once, and the fourteen teeth are in good condition to-day. In this case only gold came in contact with gold. In several instances gold pins were used, but in most of the work only retaining-points were relied upon. Cohesive gold foil, Nos. 5 and 30, was employed. It would seem a pity that such an impression as is conveyed by the language quoted should be accepted concerning operations which are performed every week in this city.—ROBERT R. HEYWOOD, New York, N. Y.

COMPOSITE FILLINGS OF ALLOY AND COPPER AMALGAMS.—In the March COSMOS, page 238, Dr. How reports Dr. Trueman's experience with composite fillings of alloy and copper amalgams. I have never seen what Dr. Trueman mentions as a fact, that if copper amalgam and alloy amalgams are inserted together the alloys will not harden.

I am in the almost daily habit of covering copper amalgam with platinum and silver alloys, with the best results, so far as hardening and appearance are concerned.—J. M. WHITNEY, Honolulu, Hawaii.

ANOTHER ANOMALY.—Mr. C. A. Merrill, of Foxcroft, Me., extracted for a young lady a few days ago an upper second molar having a rather small but normally-shaped third molar thoroughly cemented to it in a similar manner and at the same angle as the one illustrated in the May COSMOS, from Dr. Payson. The third molar was entirely covered by gum-tissue when in place.

It seems a singular coincidence that two such unusual and similar abnormalities should have been found at so nearly the same time, and within a radius of fifty miles.—H. A. ROBINSON, D D.S., Foxcroft, Me.

TO DESTROY THE ODOR OF IODOFORM.—Dr. Monroe, in the *Medical Summary*, says that aqua heliotrope following the application of iodoform will destroy its odor, and also wash from the hands the offensive effects of casual contact with the drug.—P. G.

# A MONTHLY BIBLIOGRAPHY OF DENTAL LITERATURE.

COMPILED BY J. MELVIN LAMB, M.D., WASHINGTON, D. C.

THIS bibliography will be continued monthly in the DENTAL COSMOS, and will furnish as complete a record of dental literature as can be gleaned from current periodicals and transactions of societies.

The abbreviations of titles used are those common to bibliographical work, and will, it is presumed, be readily comprehended by any one familiar with dental or scientific publications. Any explanation will be gladly furnished by the compiler.

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## ORIGINAL COMMUNICATIONS.

### THE RELATIONS OF THE TOOTH-PULP TO THE OTHER TOOTH-TISSUES.

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(Read before the New York Odontological Society, April 16, 1889.)

To interpret nature is the sublimest problem offered to the human mind. The chief object in nature is man.

The problem of human existence is unfathomable. But, seeing that man exists, we cannot silence human thought until there appears written somewhere the answer to the question, Why? We may take his physical dimensions and construct a model as perfect as the highest skill of human genius can make it, and say, There is man. You may put him upon the scales and interpret him as so many pounds, ounces, and grains of the matter composing the physical universe. You may bring chemistry to your aid and find out the different elements of nature composing his substance, and interpret him as so much oxygen, hydrogen, nitrogen, and carbon, but can you say then that you know man? You may know, further, that there is something in his nature that eludes chemism because it is a something that is not matter, which you call life, mind, spirit, soul. You have seen him now in his physical and in his spiritual aspects, but have you interpreted man? To find him out thus far has been easy work, but you know him only in his primary relations,—the different parts of himself to himself. But you scarcely know him at all until you know his relations to the universe. This knowledge answers the question, Why does man exist?

You may find a seed floating in the air, or pick one up out of the dust; you may analyze and know the elements composing it, but until you know its relations to the plant-life of the world, and to animal life as well, you do not know that seed. A tooth is a very small part of the human body, but you cannot know that tooth until you know the life-functions residing within it; and you do not know

that life-power, the so-called dental pulp, until you know its relations to the surrounding tooth-tissues, and its relations to the life of the body.

The early anatomists regarded the teeth as bones, and the internal soft tissue of the teeth as marrow,—an inert, soft, unctuous mass of matter, with no physiological function. In my youthful days it was not uncommon to hear persons speak of teeth being decayed to the *marrow*. The earliest dentists of my acquaintance called it the *nerve*. The more intelligent part of the people generally called it the *nerve* of the tooth. When and by whom it was first called pulp I do not know. It seems to have been an aristocratic rival of the word *marrow*, and to have been transferred to our dental literature from the nomenclature of medical science. This is one of many instances of our dental science suffering by inheritance. The word *pulp* means nothing, physiologically speaking; for it signifies nothing more than a mass of something—anything, it matters not how characterless. When the paper-maker grinds up rags until he has destroyed the entire texture and the fiber of the original fabric, and with sizing has mixed it into a watery jelly, he calls it *pulp*. When the cider-maker grinds up fruit, destroying every appearance of its original form and structure, it is then called cider *pulp*.

The word pulp can only properly be applied to a formless, structureless, functionless, soft mass of matter; and it belittles and degrades that highly sensitive organ of tooth development and life to call it *pulp*. We, as dentists, in common with all mankind, know the organ experimentally by its chief characteristic, the manifestation of pain. All such manifestations, wherever found, are attributed to the nervous system. In harmony with this prevailing experience and scientific fact it is every way appropriate to call it the *internal dental nerve*. No valid objection can be found in the fact that within the chamber of the tooth are also found blood-vessels and connective tissue. All nerves are largely connective tissue, and blood-vessels accompany nerves everywhere. It is probably true, also, that the cell elements of the organ are nerve-cells.

It will be well for dental science if we can fix in our minds a more definite classification of nerves strictly denominated dental nerves. There are semi-circular loops of nerve hanging from the superior maxillary nerve, and surrounding the antrum, known as anterior, middle, and posterior dental nerves, but none of these reach the teeth. Branches are thrown off from them equal in number to the roots of the superior teeth which pass down to and into the roots. These are the proper *dental nerves*, and should be known as the *external dental nerves*; and, after passing through the apical foramina of the teeth, the same should be known as the *internal dental*

nerves; for these external and internal dental nerves which I have described are *the* nerves supplying nerve-influence to the teeth. In the drawing which I have made, the proper relation of these nerves is distinctly brought to view; the teeth themselves not being represented, the direct connection of the external and internal dental nerves is more apparent, also the direct connection of the internal dental nerve with the brain. We can trace its connection through an important branch of the fifth nerve to the Casserian ganglion, to the upper portion of the medulla oblongata, and to the brain. Let me now turn your attention to the morphology of the internal dental nerve. It is first seen as a little thickening point in the dermal tissue,—a slight eminence above the plain of the surrounding tissue,—not differing from it, however, except as showing a tendency to greater vascular development. It rises until we designate it as a papilla. It is seen now to have numerous blood-vessels projected up into it, forming loops which anastomose with one another, accompanied also with numerous inosculating nerve-fibers. Gradually it assumes somewhat the form of a tooth.

In this vascular soft-tissue development we see it in the largest dimensions it ever assumes. From this time on through its entire future it diminishes its dimensions and changes the relative proportions of the different kinds of tissue which enter into its structure. Its chief function is the nutrition, growth, and development of another and a new kind of tissue, wholly unlike itself,—a hard-tissue tooth. The materials for tooth-construction are all brought in through the channels of the blood-vessels. They are the traffic ways of the new structure. Hence we find the vascular tissue far in excess of the nerve-tissue. In the development of the hard tissue there is perpetual demand for lime-salts, which must be freighted in the blood-current. As the hard tooth-structure nears completion the freighting business is not in so great demand. The blood-channels contract. The supply of blood is reduced in proportion to the lessening demand. Hence it will appear that the vascular tissue is not constant in its proportion to the other tissues of the organ. Hence, also, any histological examination of the organ to learn its elementary constituents would show a larger proportion of vascular tissue in the early age of the patient, when the tooth-structure was developing, than later in life, when the hard structure is nearing completion. Yet I have never seen this plain common-sense fact recognized in any report of the different kinds of tissue composing the so-called pulp.

Another, a pathological fact, should also be recognized in making the estimate. Inflammation induces a determination of blood to the inflamed part, and a consequent enlargement of the blood-vessels to



accommodate the increased supply of blood. When the blood-vessels are confined, as in the chamber of a tooth with unyielding walls, their expansion takes place at the expense of the other tissues occupying the same chamber, changing their relative proportions. Hence examination will show the tissues of an inflamed pulp to differ in their proportions from those of a healthy pulp.

Going forward now to the period of adult life, when there is very little, if any, tooth-development in progress, and little or no demand for lime-salts, the vascular system of the vital tissue is reduced to its minimum. If you have occasion to extirpate the vital organ of a sound and healthy tooth, and perform the operation surgically instead of by the use of poisonous vital irritants, you will find but a mere tinge of blood following the operation. The same rude extirpation of the organ when inflamed will be followed by a free discharge of blood. The former, when exposed to view, will appear like a grayish-white cord with a mere tinge of blood at its apical extremity and covered throughout its extent with a colorless lubricant, while the latter will appear like the mangled bloody fibers of a piece of beefsteak.

The foregoing observations, patent to all, lead me to say that in adult life the internal vital organ of a healthy tooth consists almost exclusively of nerve-tissue, which has in its structure a considerable amount of connective tissue. This leads us by another train of thought and observation to the conclusion that this internal organ of tooth-life and sensation can most appropriately be called the *internal dental nerve*.

Let us now observe its relations to the life of the tooth. Certainly we have no conception of an active physiological process without the manifestation of life. In fact, the activity and working of developmental processes in organic bodies is so different from all motion and activity in inorganic bodies that it necessitates the use of a term to distinguish it from all other activities and forces. Hence we term it life-force, and the tissue constructed by it we term living tissue. An important practical question faces us here for an answer.

When the life-force operating within the chamber of a tooth ceases its activity, is the tooth dead?

It may cease its activity in either of two ways,—either by dormancy or death. From the former condition it may be restored to activity under appropriate stimuli. The life of a tree and of various insects and reptilia becomes dormant through the winter; but under the revivifying influences of spring activity returns. The organ of tooth-development comes into a like condition of dormancy when the tooth has reached a stage of completeness to fully perform the functions that nature requires. It may be restored to activity and

a renewal of its former functions by irritation from without, such as mechanical abrasion or dentine decay.

Death of the living organ within presents other aspects of the case entirely different. Does death of the nerve necessarily involve and render certain the death and decomposition of the entire tooth-structure? Fortunately, a tooth has an external as well as an internal source of life through which it maintains its vital connection with the living body. So long as life and functional activity remain in the peridental membrane, a tooth cannot be said to be *dead*.

Yet we hear it affirmed not infrequently, by those to whom we look as good authority, that when the nerve of a tooth dies the hard structure begins immediately to disintegrate like dead matter. The relation of life to the soft tissues renders decomposition a necessary and inevitable consequence of death of the part. The same is not true, however, of the hard tissues of the teeth. Mineral substance is under the control of another law than that of life, which renders it in its nature indestructible under ordinary influences, except we bring ages into the calculation. When, then, perishable animal substance is brought into organic union with imperishable mineral substance, the mineral imparts to it something of its own imperishable nature. This is one of the mysteries of organic life,—that when mineral substance is brought under the sway of the life-force developing either animal or vegetable tissue, each is made to partake of the peculiar characteristics of the other. Hence the large per cent. of mineral substance entering into the structure of teeth as a component element renders them practically imperishable under ordinary influences.

We are now prepared to take up the question of the so-called dental pulp as an organ of nutrition. That it performs the function of nutrition so far as concerns its own substance cannot be doubted. But does it perform the same function to the tissues of the tooth outside of itself?

In order to give the proper limitations to the consideration of the question, it will be necessary to consider, first, nutrition in general as applied to organic functions.

All living bodies take into themselves, through the proper channels, food. All living bodies have also some process by which that food is digested and assimilated so as to become part of the animal or vegetable organism. As this is a vital process, it is as continuous as life, and results in a daily increase of the size and dimensions of the body, unless there exist some limitations in the nature of the tissue itself, or some preventive economy in nature to counteract developmental increase. This counteracting economy is found in the daily waste of tissue as the result of functional action. With the daily supply of aliment to increase the tissue there comes the daily waste

of tissue as a check upon increased development. Nutrition is, therefore, simply supplying the waste of tissue, and the requirement of nutrition is in exact correspondence to the waste. Waste is a functional process carried on chiefly by the lymphatic system. The fact of waste and renewal of tissue is so generally recognized, that physiologists have estimated that once in about seven years the entire substance of the body is wasted and renewed. If this is literally true, there is not to be found to-day a single atom of the substance that was an elementary constituent of my body seven years ago, or whatever time it requires to complete the cycle.

The study of the law of waste and renewal of the soft tissues of the body and of bones will lead to this conclusion. But there is no evidence that the teeth conform to the same law. A bone may lose substance by disease or by a surgical operation and the lost part be functionally restored. Not so with the teeth. There is no evidence that either the substance of the enamel or of the dentine, when wasted from whatever cause, is ever renewed. After the death of the enamel organ, there is no evidence of functional action in enamel. Whatever there may be found of a "reticulum" of animal matter in enamel, there is no evidence of its being *living* matter. It is wholly atrophied and rendered incapable of functional action. If, then, there is no waste of enamel by functional action, there is no demand in nature for nutrition of enamel. Enamel once formed must remain the same, except that it may be changed, as it no doubt is, by external influences. It may take to itself by affinity carbonic acid from the atmosphere, and thus become hardened, the same as do various other lime-formations.

The case is not so clear as regards dentine. Yet common observation concerning it points with convincing proof to the fact that dentine once formed needs no renewal and therefore no nutrition. We are all familiar with the fact that the peripheral portion of the dentine in the crowns of teeth does sometimes in middle life, and usually in old age, attain a density utterly precluding the possibility of functional action. We have the same fact illustrated in the finger-nails, in the extremities of the cow's horns, in the corticular portion of a deer's horns, in the tusk of the elephant, and in the teeth of rodents, whales, and dog-fish, from portions of which all life and sensation have departed, and they may be cut, sawed, or drilled without any response of life, the nerve having become functionally obliterated. This is the operation of nerve-extirpation performed by nature. Will nature be guilty of committing a "crime" against herself?

If the dental nerve may be extirpated from portions of the dentine most exposed without creating a tendency to disintegration,



why may it not be removed from the whole tooth, and the integrity of the tissue be preserved?

Proof of the imperishable nature of the teeth is found when human bodies are exhumed after a burial of hundreds of years, the teeth being all that remain in form and firmness of structure.

If of such enduring material as to resist decomposition after death for hundreds of years, it would be sublime folly indeed to presume that in life they needed to be renewed, like the perishable soft tissues, once in seven years. The conclusion that I draw, therefore, is this,—that the substance of the teeth is in its nature of such imperishable material that when once wrought into tooth-forms under the domination of vital forces it remains for indefinite periods after the life-force has become extinct, and that the organ of development and nutrition is no longer a necessity after completion of the structure; that to whatever extent animal tissue remains as a component part of hard tissue after its full development, it atrophies; and whatever degree of vitality remains in the pulp, nerve, or whatever you may please to term the developing organ, it becomes dormant, and can be aroused into future activity only by nature's necessity for reparative work. Let no one now say, as has been reported in this society, "Ingersoll says that teeth are as good without nerves as with nerves." The numerous instances of the formation of secondary or reparative dentine in cases of wearing away of the teeth after middle life are evidence of the value of the living organism within, whose chief function at this period of life is to do this work.

On the other hand, we find that the reparative work of nature in resisting decay is usually a failure. The conditions are such that the progress of decay is more rapid than the work of dentine repair. Hence the exposure of the nerve is, in most cases, inevitable.

With this prospect of failure in nature's reparative work—with the opportunities that most dentists have had to observe that the dental nerve has but a feeble hold upon life after its developmental work is completed, and that the slightest wound or even irritation often proves fatal to its life—with the evidence the profession have had in the past that the operation of "capping" in a large majority of cases results in but a brief prolonging of the life of the nerve without changing its natural tendencies to obliteration under the very slightest adverse influences,—I can but regard all efforts to save the nerve of a tooth alive when its bulbous portion is exposed, or nearly so, as empirical in the extreme and surrounded with great doubt. In every case, therefore, of dental neuritis, either from abrasion or decay, I am bound, as a conscientious practitioner, to consider the chances of failure in my treatment: not to consider simply what I would like to do, but also what I can reasonably expect will be the

result of my work, both in the immediate and remote future. I prefer, therefore, to take the risk and the chances surrounding the operation of extirpation rather than those of capping, believing that the former offers the better chances of success for the long future.

Now I have something to say concerning sensitive dentine, and the relation of the internal dental nerve to it.

For the purpose of making my remarks plain I wish to call your attention to the common, yet deceiving, illustration in the books of the tooth-tissues *in situ*.

An incisor tooth, for example, is divided longitudinally. The nerve-tissue of the tooth is described as occupying a central cavity corresponding in its general outline to the form of the tooth, having its greatest diameter in the crown, and its least diameter in the extreme end of the root, where it becomes a mere thread as it passes out through the apical foramen.

The dentine is described as surrounding this nerve-tissue, and constituting the chief body of the tooth. It is composed of both animal and mineral tissue, in the proportions of about twenty-five per cent. of the former and seventy-five per cent. of the latter. It is tubular in its structure, the tubules being occupied by soft-tissue fibrils known as fibrils of the dentine,—*dentinal fibrillæ*. I said that this illustration is deceiving. It represents these fibrils as parts of and belonging to the dentine: hence the name *dentinal fibrillæ*. When these fibrils are in a pathological and hypersensitive condition, we are accustomed to attribute the sensation to the dentine and call it *sensitive dentine*, or *hypersensitive dentine*, thus anatomically and pathologically uniformly associating these fibers with the dentine.

When a dentist is excavating a cavity in such dentine and his patient cries out, "You are in to the nerve," he assures the patient that he is nowhere near the nerve,—that the sensitiveness is only that of "sensitive dentine." With this assurance he proceeds to excavate. The patient again cries out, "I cannot stand it! you are working right in on the nerve." The dentist again assures him that he *is not* touching the nerve: "it is nothing but sensitive dentine." "What makes it hurt, then?" the patient asks, vexed with pain. The uniform answer is repeated, "Sensitive dentine."

The operator is using the language of theory,—the language of the books; the patient is using the language of fact and feeling,—the language of common sense, and not the language of fancy and fiction. If the operator would speak the truth, he would acknowledge that he was cutting off the fibrils, not of the dentine, but fibrils of the internal dental nerve,—the fibrils of the so-called pulp. Instead of that, he, for the time being at least, deceives himself and his patient also with the false idea that these are fibers of the dentine.

Let me now put it in other very common language. The patient says, "The nerve is *exposed*." The operator insists that the nerve is not "exposed,"—that it is yet an eighth of an inch in to the nerve. "Well, it aches," says the patient. "What makes that?" Again the confounding answer comes, "Sensitive dentine." If I shut down a window-sash upon your finger, you will very likely complain that I am hurting your hand. Will it be a very satisfying answer to you if I say, "Your hand is not caught by the window-sash,—nothing but your finger"?

I complain to the court that you have disfigured, wounded, and mutilated my valuable dog. You go into court and swear that you did not touch the dog; that you only cut off his tail; that the operation was not within six inches of the dog!

We must cease to entertain the idea that sensation belongs to the dentine, and cease to use language that may convey such a meaning. And in every operation upon the teeth we must have our minds fully possessed of the fact that all sensation developed in the dentine is really to be attributed to the internal dental nerve; that when the so-called dentinal fibrils are wounded the pulp is wounded, for they are fibrils of the pulp, and not of the dentine; that when inflammation is excited in the nerve-fibrils that inflammation may, and often does, extend to the nerve and produce dental neuritis (I want to get rid of the word *pulpitis*). We know well enough that when a finger is wounded the inflammation may, and often does, extend to the whole hand. We also know experimentally that the operation of filling even a pin-head cavity in the remotest angle of a tooth sometimes does cause the death of the nerve. What must be the danger, then, in larger cavities? When grinding off the enamel of a tooth to reshape the crown for the adjustment of artificial caps, crowns, and bridge-work, a large number of nerve-fibrils are often exposed thereby, causing the death of the body of the nerve. Dentists should become fully possessed with the idea that the nerve of a tooth is exposed, in a *pathological* sense, whenever the nerve-fibrils are exposed, and that they are exposed whenever you pass the enamel which covers the living dentine.

I wish now to present another view,—a very practical point in operative dentistry. In this day, when immediate root-filling has become somewhat popular, it is worth our while to examine it in all its aspects. The operation is surgical, medicinal, and mechanical, and has its basis in the theory that in the treatment of diseased teeth in which root-filling is contemplated all that is required in preparation for the mechanical operation is a thorough removal of the contents of the internal cavity, whether it be living or dead tissue, give the root-canal the proper antiseptic treatment,



then fill at once,—the entire operation being performed at the same sitting,—trusting to *vis naturæ* for the result.

Take the case of a tooth requiring extirpation of the nerve; you expose it sufficiently for the operation, and with a nerve-hook or other instrument draw it out bodily, having previously applied the devitalizing agent; or you devitalize by percussion, driving into the canal with a sudden blow a sharpened point of wood. After removal of the lifeless tissue you lay it out upon a piece of white paper, and have in its outline and dimensions the general form of the internal cavity of the tooth, and you fancy that you have drawn out the *entire pulp* bodily. What has become of the pulp processes,—the nerve-fibrils? There were hundreds of them ramifying the dentine, and constituting part of the living organism which you are attempting to extirpate. If you have not drawn out these nerve-fibrils, you certainly have not drawn out the *whole* nerve. You have done the same as the bushwhacker who draws up the young tree, leaving the roots in the ground. Earth is a good antiseptic, but it will not preserve the roots of a tree from ultimate decay. Ramifying the dentine as the fibrils do, to the very periphera, and there uniting with the lacunal cells of the cementum, is it any wonder that the peridental membrane should become diseased, and the tooth itself feel sensitive and sore to the touch? The treatment of the nerve-fibrils becomes, therefore, the critical part of the operation of nerve-extirpation. They must inevitably decompose at some time. This tendency may be restrained for a while by antiseptics; but like herring and ham antiseptically treated, moisture and warmth bring on a taint at last.

Were it possible in the nature of the case to draw out a dental nerve entire, with all its processes attached, and it then be laid out upon paper with its processes or fibrils diverging as in position in a tooth, the internal dental nerve would appear like a bone-corpuscle or like a multipolar nerve-corpuscle. This you will see from the representation here on the blackboard.

The last division of my subject to which I wish to call your attention is *the ganglionic nature of the dental pulp*.

This part of my subject cannot be comprehended or studied *per se*. It must be studied as a part of the nervous system. The isolated location of the internal dental nerve anatomically—confined as it is by walls of dense ivory, connected only by a nerve-fiber with the general nervous system—renders the mistake a natural one to disconnect it in thought and study from all relation to the nervous system. We can study any other organ as differing from all the others in its form, structure, and functions. But when we come to the study of the nervous tissue we find that nerves are of the same

kind everywhere in the body,—that the nerves of one organ do not differ from the nerves of any other organ.

The nervous system has one common center of nerve-power and function,—the brain. Touch a nerve in the remotest part of the body, and its sensation is referable to the great sensorium, the brain. If we desire to learn what nerves are, we must first learn what the brain is; we must know its substance and its functions.

Nerves are simply prolonged fibers of the brain: they are the distribution of brain-tissue throughout the body. The brain, on the other hand, is simply nerve-tissue in mass. It is constructed so as to generate the largest amount of nerve-force and influence within the smallest space, and adequate to supply the whole body. It is, therefore, in every sense a nerve-center, the *great* nerve-center of the human body. It is called the *great* nerve-center with reference to numerous small nerve-centers distributed throughout the body, which are centers of nerve-influence for different organs or limited territory variously occupied. These smaller nerve-centers are also commonly called ganglia, and in harmonious nomenclature the brain is called the great ganglion. The ganglia are also called little brains. Thus it appears, at least by the nomenclature of the science, that nerve-tissue is the same throughout the body. As the great ganglion is a mass of nerve-tissue, the small ganglia are masses of nerve-tissue for the generation of nerve-influence for particular organs, all reporting to the great sensorium. Wherever, then, a mass of nerve-tissue is found with nerve-fibers projecting from it and reaching out to peripheral regions, it is called a ganglion,—a nerve-center.

Two kinds of substance are recognized as constituting nerve-tissue,—one gray, and the other white. The gray is made up of nerve-corpuscles, and the white is fibrous in its structure. The ganglia are masses of the gray matter traversed by threads of the white. Cleland says in his work on animal physiology, “Any nervous mass containing nerve-corpuscles is called a ganglion.”

Before making any examination of the internal dental nerve to learn the nature of the tissue and its structure,—whether it be corpuscular or fibrous, or both,—let us trace back the dental nerves through the line of the fifth nerve to their origin, and learn their ancestral character and what developments we may possibly expect in harmony with the character of the original.

The fifth nerve arises from the upper portion of the medulla oblongata by two roots,—one a small root from the motor system, and the other several times larger, a sensory root, from the great sympathetic system. This sympathetic system is very generally known as the *ganglionic system*. True to the nature of the principal root, it forms the Casserian ganglion. This great sympathetic nerve

in which the fifth nerve has its origin, and to which the nerves of the teeth belong, is called the ganglionic nerve, because of the numerous ganglia formed throughout its distribution, and especially, as all physiologists affirm, near their terminal ends. We find, therefore, developed on the fifth nerve, in addition to the ganglion of Casserio, the ophthalmic ganglion, Meckel's ganglion, ganglion of Cloquet, Arnold's ganglion, submaxillary ganglion, and the most distinctly marked of all, the *dental ganglion*, at its last distributing-point, the so-called pulp. In addition to these which I have named, there are numerous smaller ganglia, notably a ganglion formed near the apical portion of the root of each tooth. These are commonly called nerve-plexuses. But they correspond more nearly to the structure of ganglia than to plexuses; not being formed by decussation of two or more nerves, but by a division of the fibers of a single nerve, and forming several from a common center. These go to supply the peridental membrane, the gum, the inter-alveolar bone, and one or two branches are sent into the chamber of the tooth through the apical foramen. Here the nerves divide into an innumerable number of fibers running by circuitous routes among and into the cell elements of the structure, and apparently terminating at or a short distance within the tubules of the dentine. Whether there is a real or only an apparent termination near the openings into the tubules, we may be able to learn hereafter.

Let us now for a while divest ourselves of some misconceptions of the nervous system so common among professional men,—that it is made up of bundles of white cords separated at intervals into their individual fibers, and distributed through all the organs and among all the tissues of the body like a skein of white silk. This idea first comes to the mind through the illustrative plates so commonly given in works on anatomy. Then it is demonstrated to the student on the cadaver: the nerves of the body are dissected up, and exhibited to the eye, and fastened in the memory as so many white cords or threads constituting the nervous system in its distribution through the body. The spinal nerve is looked upon as a fibrous rope-like cord in larger bundle than the other nerves, and all together reeled off from the brain as a great coil or knot of nerve-tissue housed in the cranium for general supply.

Drop now this mere mechanical and constructive idea of the nervous system, and look at it from the ganglionic stand-point. Writers on the subject direct our attention to the brain as the great ganglion, composed chiefly of ganglionic tissue. Then attention is turned to the spinal cord as the long ganglion, and to the great sympathetic nerve as composed of a chain of ganglia in close proximity to one another and connected together by commissures of nerve-cord or



bands. Looking into the viscera we find numerous ganglia linked to the great chain of ganglia composing the sympathetic system, and located at convenient points to give functional action to the different organs and to respond to excitations and impressions made upon innumerable capillary nerves which each ganglion sends out to the periphery of the organ over which it presides. It is seen, therefore, to be a nerve-center towards which all peripheral nerves within its area of supply converge. In pathology nothing is talked of more than reflex nerve-action, which derives all its meaning from the wide distribution and functional activity of ganglia. They are the centers of pain as well as of nerve-force. Various diseases and disorders are traced from these centers where the pain is located to some peripheral region where the disease is located. The common mode of conceiving of the nervous system is like the attempt to gain an idea of the great telegraphic system of America by looking at the multitude of wires stretched throughout a large city and extending from city to city, without going into the offices where are kept the batteries, the wire-coiled magnets, and the clicking telegraphic machinery: these are the *ganglia* of the telegraphic system.

The office is a telegraphic center of a system of diverging wires. Wherever you find a cluster of wires stretched over your head and converging toward some central point, you may know that at the point of convergence there is a battery. So wherever you find a multitude of nerve-fibres converging toward a common center, you may know that at that point of convergence there is a ganglion.

This is the law of construction of the nervous system, and it is in every sense politic and economic. While the brain is the great metropolis of the system, supplying life and energy to the whole body, a large amount of the distributing work is done by the ganglia.

The nervous system is like the great traffic system of America. The business life and energy of the country are centered in New York City, and concentrated also in other widely separated business centers under the control of the New York markets. There must be distributing-points for both money and commodities. Cities are the ganglia of the traffic system; ganglia in the human system are as much a fixed necessity as cities in the development and growth of a country. As in Italy all roads lead to Rome, so all nerves lead to a ganglia as a common center.

Now look at the figure which I have drawn upon the board, representing the internal dental nerve with its numerous processes diverging in every direction, and tell me if it is not a nerve-center; and what, let me ask, is a nerve-center but a ganglion? and located within the central cavity of a tooth it becomes by birthright from the great sympathetic ganglionic system the true *dental ganglion*.

# STATISTICS OF CONSTITUTIONAL AND DEVELOPMENTAL IRREGULARITIES OF THE JAWS AND TEETH OF NORMAL, IDIOTIC, DEAF AND DUMB, BLIND, AND INSANE PERSONS.

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(Read before the Dental Section of the American Medical Association at Newport, R. I., June 25, 1889.)

In some papers read before the Odontological Society of Great Britain from 1864 to 1872, the general opinion was expressed that certain marked forms of irregularities of the jaws and teeth prevailed largely among the feeble-minded, and that when found in children they constituted a marked symptom of a low order of mental development. Thus, in May, 1864, Mr. Cartwright, in a paper entitled "Reflections on the Cause and Treatment of Some Forms of Irregularities," said that irregularity of the teeth "is the result of high and selective breeding." This opinion I have already discussed in a paper read before the Indiana State Dental Society on June 26, 1888, on "Arrest of Development of the Maxillary Bones due to Race-crossing, Climate, and Soil," published in the DENTAL COSMOS, August, 1888.

In June, 1864, Mr. Thomas Ballard read a paper before the Odontological Society on "The Constitutional Ill Effects of Fruitless Sucking, and the Diagnostic Value of Deformed Jaws in Relation thereto," in which he claimed that thousands of children die annually of diseases primarily due to fruitless sucking; "but many of the sufferers escape death, and constitute a class of defective individuals with which society abounds. The worst form is the idiot, and in this class there are many degrees." Again he says, "I hold that the deformities to which I refer"—but which he does not mention specifically—"are produced solely by the retained habits of sucking; and it is the children who have been exposed to fruitless sucking and consequent persistent diarrhea, with its attendant evils, when infants, who acquire the retained habits of sucking, and thus get their jaws deformed. And as in idiots are seen the worst forms of defective growth, so also do they exhibit the most aggravated forms of deformed jaws and teeth, the habits of sucking being retained by them to an advanced age. . . . So also are the deformed jaws and teeth commonly to be observed among the ill-grown, phthisical, and the weak and delicate members of society. The normal jaw, with well-set and perfect incisor teeth, is the principal characteristic feature of an individual possessing a sound constitution." I shall show subsequently in this paper that it is not true that idiots present the most aggravated forms of deformed jaws and teeth.

In his work on "Deformities of the Mouth" Mr. Oakley Coles attributes intermaxillary prognathism to a force operating on the intermaxillary bone, such force originating in the body of the sphenoid, and being transmitted to the intervening nasal septum. By *force* he means a direction of growth in a given line, of such energy as to overcome the resistance offered to it by surrounding structures. In regard to the sphenoid bone he says, "It may be urged that too much importance is attached to the influence of the sphenoid, but it must be borne in mind that this bone continues to grow up to about twenty-five years of age. This will in part explain the fact of deformities of the upper jaw appearing after the eruption and shedding of the temporary teeth, and becoming intensified toward adult life." Arguing back from the development of cases of double hare-lip to premaxillary prognathism, he thinks that we can come to no other conclusion "than that the duration and extent of the force operating upon the intermaxillary bone determines the nature and extent of the deformity that will be produced." He sees the natural objection to this view, that as the prognathism is not pronounced in early life, and as the union of the intermaxillary bones with the true maxillary bones is complete at this time, it is impossible that the intermaxillary bone can be the subject of any subsequent change. But, having shown that "Intermaxillary prognathism is but a preliminary step in the deterioration of the form that will produce in a subsequent generation (subjected to like conditions of propagation) double hare-lip," he assumes that the general cranial development will in the two cases bear some relation to each other; and as Hutchinson has shown that in cleft-palate cases ossification of the sutures is delayed to a period far beyond the usual date, so in cases of intermaxillary prognathism the sutures would not be so much ossified as to oppose any sufficient resistance to the exercise of the force originating in the sphenoid. He then goes on to say that many cases of prognathism are associated with such central lesions as will manifest themselves in the form of idiocy or imbecility, and distinctly asserts that such a deformity as prognathism occurring among the highly civilized is a distinct mark of deterioration of stock. "After carefully examining the works of various writers on the subject of microcephalic idiocy," he says, "there seems sufficient evidence to justify the belief that premature ossification of the sutures is the rule in the majority of these cases; and we may, therefore, assume, if we cannot absolutely conclude, that this influence operates powerfully in the production of the dental deformity known as the lambdoid jaw;" a view held by Virchow, but combated by Ireland and Langdon Down.

Dr. Louis Ottofy, in his paper on "The Incipency of Dental



Caries," read before the joint meeting of the American and Southern Dental Associations at Louisville, on August 30, 1888, reported an examination of the mouths of 623 children,—317 males and 306 females. These children were pupils in the public schools at Grand Forks, Dakota; Lebanon, Ill., and Chicago. The following table shows the percentage of irregularities:

Age.	Irregular.	Regular.
5.....	0 p. c.	100 p. c.
6.....	9	91
7.....	27.5	72.5
8.....	43	57
9.....	14	86
10.....	31.5	68.5
11.....	32.5	67.5
12.....	25	75
13.....	20	80
14.....	35	65
15.....	28	72

It will be seen that the largest percentage of irregularities is found at the age of eight years. The cuspid teeth are appearing at this time, and at least one-half of the irregularities are due to local causes. At the age of thirteen but 20 per cent. of the cases showed deformities; nature and a judicious use of the forceps had corrected many of them. At the age of fifteen, 28 per cent. of the teeth were irregular. I venture the opinion that if these examinations could have been extended to the age of twenty years, the percentage of irregularities would have diminished. The development of the jaws at this age would allow nature to reduce many of these abnormal conditions.

The following table shows the results of examinations of mouths of one thousand children over twelve years of age, made by myself:

No.	Sex.	Normal.	Large Jaw.	Protrusion Lower Jaw.	Protrusion Upper Jaw.	High Arch.	V-Shaped Arch.	Partial V-Shaped Arch.	Saddle-Shaped Arch.	Small Teeth.
396	Male.	313	11	3	5	26	5	18	12	13
604	Female.	467	8	4	2	30	6	43	21	17
1000	...	780	19	7	7	56	11	61	33	30
Per Cent.		7.8	1.9	.7	.7	5.6	1.1	6.1	3.3	3.0

The difference between Dr. Ottofy's percentages and those shown in the above table is accounted for by the fact that in his table both

local and constitutional causes are included, while in mine the many deformities due to local causes are excluded.

Nearly all of these cases were residents of Chicago and had been attended by the dentist regularly. These irregularities, therefore, might be classed as constitutional or developmental, as they could not be prevented by the dentist by the use of the forceps. We naturally suppose that the majority of the children examined by Dr. Ottofy, living as they did in the country, had received but little attention from the dentist,—which would account for the presentation of more irregular cases than among those examined by me. It is possible also that some of those I examined had had slight irregularities corrected while they were young, thus preventing serious complications when maturity was reached. I should expect to find quite a difference in the percentage of irregularities in different parts of the country. When people are confined in-doors, and do brain-work chiefly, as do those living in cities, they are likely to have more irregularities than country people. So also among those living in old parts of the country, as the New Englanders, rather than in residents of a new part of the country.

#### THE JAWS OF IDIOTS.

Dr. W. W. Ireland has defined idiocy as "mental deficiency or extreme stupidity depending upon malnutrition or disease of the nerve-centers, occurring before birth or before the evolution of the mental faculties in childhood." A definition that seems more inclusive, and that more clearly describes the tissues of the body, is the one given by Dr. Shuttleworth: "A vile vice of the entire organism; an affection not only of the nervous system but of the functions generally of organic life." Not a tissue of the body is exempt; the phenomena that check development of the brain-tissues will also interfere with proper development of the other tissues of the body.

No part of the body has received the impress of disease so markedly as the osseous system, and yet pathologists have given this part of the idiotic system but little attention. This osseous system seems to have been constructed regardless of symmetry or uniformity. While in the normal individual the lateral halves are never uniform, in the feeble-minded the greatest asymmetry prevails. This want of harmony is more apparent in the maxillary bones because of their peculiar formation and environment. The close proximity of the jaws and their articulation permit of irregularities being readily observed. At the beginning of my examinations I observed that other deformities than the V- and saddle-shaped existed, all of which must be considered. I found both excessive and arrested development of the maxillary bones; arrest of the one

and excessive development of the other; protrusion of the upper or lower jaw; high or low vault; partial V- and partial saddle-shaped arches; semi-V and semi-saddle-shaped arches; semi-V and semi-saddle-shaped on the same side, and small teeth.

Of late years some American investigators have made examinations among the inmates of our institutions for idiots, and reported that they found about the same proportion of irregularities as may be seen in ordinary practice. The varying opinions among scientific men on either side of the Atlantic led me to investigate the subject carefully. The examinations were made by myself and by able dentists in the following named institutions:

Asylum for Idiots of the State of New York, at Syracuse; Massachusetts School for Feeble-minded, at South Boston; Illinois Asylum for Feeble-minded Children, at Lincoln; Asylum for Idiots, Randall's Island, N. Y.; Minnesota Training-school for Idiots and Imbeciles, Faribault; Kansas State Asylum for Idiots and Imbeciles, South Winfield; Cook County Insane Asylum, Dunning, Ill.; Pennsylvania Institution for Feeble-minded Children, at Elwyn.

(Special reports may be found in the Transactions of the International Medical Congress, 1877, and in the Annual, 1888.)

The following tables show the total number of irregularities in each grade and sex:

#### DEFORMITIES IN THE JAWS IN ALL GRADES.

##### *High Grade.*

No.	Sex.	Normal	Large Jaw.	Protrusion Lower Jaw.	Protrusion Upper Jaw.	High Arch.	V-Shaped Arch.	Partial V-Shaped Arch.	Thumb-Sucking	Saddle-Shaped Arch.	Small Teeth.
334	Male.	190	33	10	36	84	16	44	2	51	16
228	Female.	132	14	14	17	57	15	12	5	23	14
562	...	322	47	24	53	141	31	56	7	74	30
Per Cent. . .		57.2	8.3	4.2	9.4	25.	5.5	9.9	1.2	13.1	5.3

##### *Middle Grade.*

No.	Sex.	Normal.	Large Jaw.	Protrusion Lower Jaw.	Protrusion Upper Jaw.	High Arch.	V-Shaped Arch.	Partial V-Shaped Arch.	Thumb-Sucking	Saddle-Shaped Arch.	Small Teeth.
434	Male.	261	34	19	22	41	25	45	1	33	11
316	Female.	195	17	9	18	26	16	46	5	24	12
750	...	456	51	28	40	67	41	91	6	57	23
Per Cent. . .		60.8	6.8	3.7	5.3	8.9	5.4	10.8	.8	7.6	.3



*Low Grade.*

No.	Sex.	Normal.	Large Jaw.	Protrusion Lower Jaw.	Protrusion Upper Jaw.	High Arch.	V-Shaped Arch.	Partial V-Shaped Arch.	Thumb-Sucking	Saddle-Shaped Arch.	Small Teeth.
271	Male.	97	37	23	32	55	33	39	7	37	9
394	Female	220	27	17	34	56	24	50	11	39	9
665	...	317	64	40	66	111	57	89	18	76	18
Per Cent.		47.6	9.6	6.	9.9	16.6	8.5	13.3	2.7	11.4	2.7

## TOTAL DEFORMITIES IN THE JAWS.

No.	...	Normal	Large Jaw.	Protrusion Lower Jaw.	Protrusion Upper Jaw.	High Arch.	V-Shaped Arch.	Partial V-Shaped Arch.	Thumb-Sucking	Saddle-Shaped Arch.	Small Teeth.
1977	...	1095	152	92	159	318	129	236	31	207	71
Per Cent.		55.3	7.6	4.6	7.9	16.	6.5	11.9	1.5	10.4	3.5

The above tables show that almost one-half of the whole number examined had irregularities of the jaws and teeth. The examined children were over nine years of age. Under that age irregularities might be considered as of local origin, while constitutional and developmental irregularities do not appear until the eruption of the incisors and first permanent molars. As would be expected, the largest percentage of irregularities is found in the low-grade class; and it is seen that the normal classes in the high and middle grades vary only about 12 per cent.; the middle grade showing the largest percentage of normal jaws and teeth, the high grade the next, and the low grade the fewest number of normal cases.

The mental capacity of the idiot can indicate in a general way only the abnormal condition of the osseous as well as muscular, venous, and arterial systems of the individual; thus, a high-grade idiot might possess an atrophied condition of any of the tissues of the body, while a low-grade idiot might develop any or all of the tissues to an excessive degree, this depending of course upon the inclination and condition of the blood-supply. Thus the arterial and nervous systems might be atrophied on one side, lessening the supply of blood to that side or limb, and producing atrophy of the muscular and osseous tissues on that side. The opposite effect might be produced on the other side; a large amount of blood would be carried naturally to the extremities of the other side, causing hypertrophy of tissue.

If the tissues of the body are so prone to take on abnormal con-

ditions, certainly the jaws must suffer more or less. I have observed three conditions that account for nearly all the irregularities of the jaws and teeth: excessive development, arrest of development, and inharmonious development of the maxillary bones. These abnormalities are developed with the osseous system, and may be properly termed constitutional and developmental.

When excessive development occurs in one jaw, and the other is normal, or arrested development ensues, then the teeth in the abnormally large jaw protrude.

If the cranium is large, the superior maxilla is usually larger than normal. When the inferior maxilla is involved, the rami are as likely to be enlarged as the body of the bone. Sometimes the rami and the body develop uniformly. When there is excessive development of a part or all of the bone, protrusion of the lower jaw and teeth takes place. I have seen cases in which one half of the superior and inferior maxillæ, as well as one-half of the cranium, was larger than the other. In these irregularities of the jaws, however, irregularities of each set of teeth are seldom seen. While it is proper to speak of these conditions as irregularities, yet they are so only as one jaw is related to the other.

I have already shown, in a paper read before the Dental Section of the American Medical Association in 1888, that irregularities of the teeth, which I have termed constitutional, prevail to a greater extent among the idiotic, deaf and dumb, and blind than among an equal number of strong and well-developed persons; that not only is the brain-matter deficient in the feeble-minded, but that many cases are seen which show that the osseous system is generally defective; and that when the bone-tissue is arrested in development from malnutrition, the maxillary bones are affected.

It is frequently the case that when idiocy appears in a family, other members of the family are observed to be scrofulous, deaf, dumb, blind, or insane, showing that the conditions indicating neurotic tendencies have been transmitted through generations.

In his work on "Insanity in Norway," Ludwig Dahl gives many instances in which the result of this tendency is deafness, dumbness, or insanity, as often as idiocy. He says, "Acquired insanity and idiocy frequently appear side by side in the same family stock. Deaf-dumbness occurs frequently." He has traced the genealogies of a number of families, and has brought to light a number of interesting facts. In his genealogy of No. 3, the Ejvinds family have nine insane or idiotic, four deaf and dumb, and one epileptic. Other families showed a similar proportion of mentally and physically deformed persons.\*

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\* Lombroso has called attention to deformities of the jaws among the born criminals.

In his work on "Idiocy and Imbecility," p. 528, Dr. Ireland says, "Deafness frequently occurs in families where some of the other members are idiots." And again, on page 16, "The children of epileptics are frequently insane or idiotic or hysterical, and the descendants of an insane person are often epileptic, idiotic, or insane. Deaf-dumbness, chorea, locomotor ataxia, hysteria, and other disorders of the nervous system now and then occur in the descendants, apparently as the result of an inherent neurotic tendency in the family."

In the report of the Commissioner on Idiocy appointed by the Legislature of Connecticut (see Report of Commissioners on Idiocy to the General Assembly of Connecticut, New Haven, 1856, p. 35), it was found that out of seventy cases of idiocy there were ten cases of idiotic parents, six insane persons, six insane relatives, eight epileptic parents or relatives, eight blind, and two melancholic.

Dr. Howe shows ("On the Causes of Idiocy," Edinburgh, 1858, p. 35) that in seventeen families in Massachusetts the heads of which were blood-relations, there were born ninety-five children, of which forty-four were idiotic, twelve scrofulous and puny, one deaf, and one a dwarf. Morel and the school of investigation which he founded point out that the defective classes—*i.e.*, the congenital deaf mute, blind, lunatic, idiotic, criminals, and paupers—are buds on the same tree of human degeneracy. In dealing with the evidences of degeneracy they cite defective teeth as one of the signs in most instances. These signs are atavism or reversion to lower types of structure and function. Many more cases could be given showing that a relation exists between the deaf, dumb, blind, and insane, but it is evident that the offspring of parents showing neurotic tendencies and symptoms are subject to these conditions. Medical men have commonly classified these lesions under the same head, and some specialists go so far as to classify the criminal and drunkard in this category. I have recently read an article from a French journal in which a left-handed person was also included.

While specialists have generally concluded that most of these conditions are derived from a common neurotic ancestry, the only common feature is a very low grade of cerebral development. In my investigations concerning the osseous system in its relations to the irregularities of the jaws and teeth, I have observed a lesion common to all these conditions. With this object in view I have made examinations of the mouths of all these classes except the criminal, and these I hope to examine in the near future. I found great difficulty in enlisting sufficient interest on the part of superintendents of Blind Asylums to enable me to make proper examinations of the blind, their reason being that the sensitive nature of



the patients would not permit of their exhibiting the mouth for examination. I have conducted a sufficient number of examinations, however, to make some estimate of the percentage of deformities of the jaws and teeth.

#### DEAF AND DUMB.

The greatest interest has been shown by the superintendents of Deaf and Dumb Institutions, thus enabling me to make very satisfactory examinations. In some of the institutions visited, the blind are retained with the deaf and dumb; when such was the case the blind were classed with the deaf and dumb. The examinations were made either by myself or by able dentists living in the town or city where the institution was located. The following tables show the result :

##### MINNESOTA SCHOOL FOR THE DEAF, FARIBAULT, MINN.

No.	Sex.	Normal.	Large Jaw.	Protrusion Lower Jaw.	Protrusion Upper Jaw.	High Arch.	V-Shaped Arch.	Partial V-Shaped Arch.	Saddle-Shaped Arch.	Small Teeth.
96	Male.	46	7	3	4	18	3	14	10	...
67	Female.	26	1	3	4	14	1	12	11	...
163	...	72	8	6	8	32	4	26	21	...

Examined by Dr. E. K. Clement. J. L. Noyes, Sup't.

##### PORTLAND SCHOOL FOR THE DEAF, PORTLAND, ME.

No.	Sex.	Normal.	Large Jaw.	Protrusion Lower Jaw.	Protrusion Upper Jaw.	High Arch.	V Shaped Arch.	Partial V-Shaped Arch.	Saddle-Shaped Arch.	Small Teeth.
7	Male.	3	2	1	...	...	...	1	...	...
10	Female.	7	...	...	1	1	...	...	...	...
17	...	10	2	1	1	1	...	1	...	...

Examined by Thos. Fillebrown. Ellen L. Barton, Principal.

##### OREGON SCHOOL FOR DEAF MUTES, SALEM, OREGON.

No	Sex.	Normal.	Large Jaw.	Protrusion Lower Jaw.	Protrusion Upper Jaw.	High Arch.	V-Shaped Arch.	Partial V-Shaped Arch.	Saddle-Shaped Arch.	Small Teeth.
9	Male.	5	1	2	3	1	...	4	1	...
11	Female.	4	2	3	4	3	1	3	...	1
20	...	9	3	5	7	4	1	7	1	1

Examined by I. T. Mason. P. S. Knight, Sup't.

MILWAUKEE DAY SCHOOL FOR THE DEAF, MILWAUKEE, WIS.

No.	Sex.	Normal.	Large Jaw.	Protrusion Lower Jaw.	Protrusion Upper Jaw.	High Arch.	V-Shaped Arch.	Partial V-Shaped Arch.	Saddle-Shaped Arch.	Small Teeth.
20	Male.	...	1	...	3	2	2	2	1	2
12	Female.	...	1	2	2	3	...	2	1	2
32	..	...	2	2	5	5	2	4	2	4

Examined by Claude A. Southwell, D.D.S. Paul Binner, Sup't.

WASHINGTON SCHOOL FOR DEFECTIVE YOUTH, VANCOUVER, W. T.

No.	Sex.	Normal.	Large Jaw.	Protrusion Lower Jaw.	Protrusion Upper Jaw.	High Arch.	V-Shaped Arch.	Partial V-Shaped Arch.	Saddle-Shaped Arch.	Small Teeth.
11	Male.	6	1	4	...	4	2	...	1	1
9	Female.	4	1	1	...	3	1	...	1	...
20	...	10	2	5	...	7	3	...	2	1

Examined by A. B. Eastham. Jas. Watson, Sup't.

ARKANSAS DEAF-MUTE INSTITUTE, LITTLE ROCK, ARK.

No.	Sex.	Normal.	Large Jaw.	Protrusion Lower Jaw.	Protrusion Upper Jaw.	High Arch.	V-Shaped Arch.	Partial V-Shaped Arch.	Saddle-Shaped Arch.	Small Teeth.
51	Male.	15	4	1	8	14	9	7	5	7
53	Female.	18	5	1	3	15	2	12	4	7
104	...	33	9	2	11	29	11	19	9	14

Examined by M. C. Marshall, D.D.S. F. D. Clarke, Sup't.

IOWA INSTITUTE FOR DEAF AND DUMB, COUNCIL BLUFFS, IA.

No.	Sex.	Normal.	Large Jaw.	Protrusion Lower Jaw.	Protrusion Upper Jaw.	High Arch.	V-Shaped Arch.	Partial V-Shaped Arch.	Saddle-Shaped Arch.	Small Teeth.
144	Male.	80	6	7	15	8	7	15	6	...
104	Female.	54	2	9	15	8	6	8	2	...
248	...	134	8	16	30	16	13	23	8	...

Examined by Geo. C. Brown, D.D.S. H. W. Rothert, Sup't.

CLARKE INSTITUTE FOR DEAF MUTES, NORTHAMPTON, MASS.

No.	Sex.	Normal.	Large Jaw.	Protrusion Lower Jaw.	Protrusion Upper Jaw.	High Arch.	V-Shaped Arch.	Partial V-Shaped Arch.	Saddle-Shaped Arch.	Small Teeth.
45	Male.	24	1	...	...	11	1	3	5	...
46	Female.	19	...	4	1	10	...	2	10	...
91	...	43	1	4	1	21	1	5	15	...

Examined by Dr. J. N. Davenport. Caroline A. Yale, Sup't.

## EVANSVILLE DEAF-MUTE SCHOOL, EVANSVILLE, IND.

No.	Sex.	Normal.	Large Jaw.	Protrusion Lower Jaw.	Protrusion Upper Jaw.	High Arch.	V-Shaped Arch.	Partial V-Shaped Arch.	Saddle-Shaped Arch.	Small Teeth.
18	Male.	10	13	...	...	10	4	...	5	2
6	Female.	3	2	...	...	4	2	...	3	3
24	...	13	15	...	...	14	6	...	8	5

Examined by I. Haas. Prof. Chas. Kerney, Sup't.

## INSTITUTION FOR THE DEAF, DUMB, AND BLIND, BERKELEY, CAL.

No.	Sex.	Normal.	Large Jaw.	Protrusion Lower Jaw.	Protrusion Upper Jaw.	High Arch.	V-Shaped Arch.	Partial V-Shaped Arch.	Saddle-Shaped Arch.	Small Teeth.
66	Male.	57	1	...	...	2	1	4	...	1
40	Female.	23	4	...	1	7	1	2	...	2
106	...	80	5	...	1	9	2	6	...	3

Examined by Dr. A. F. Merriman. W. Wilkinson, Sup't.

## KANSAS INSTITUTE FOR THE DEAF AND DUMB, OLATHE, KAN.

No.	Sex.	Norm.	Large Jaw.	Protr. Lower Jaw.	Protr. Upper Jaw.	High Arch.	V Sh'd Arch.	Partial V-Shaped Arch.	Saddle-Shaped Arch.	Small Teeth.	Large Teeth.
110	Male.	73	89	7	25	81	18	33	35	4	99
83	Female.	37	57	15	29	38	31	4	35	29	51
193	...	110	146	22	54	119	49	37	70	33	150

Two cases cleft palate.

Examined by Dr. Sawyer. S. T. Walker, Sup't.

## INSTITUTE FOR THE DEAF AND DUMB, AUSTIN, TEX.

No.	Sex.	Normal.	Large Jaw.	Protrusion Lower Jaw.	Protrusion Upper Jaw.	High Arch.	V-Shaped Arch.	Partial V-Shaped Arch.	Saddle-Shaped Arch.	Small Teeth.
66	Male.	19	9	...	4	24	3	2	7	10
58	Female.	25	6	1	4	30	4	3	12	7
124	...	44	15	1	8	54	7	5	19	17

Examined by Dr. F. S. Casper. W. Kendall, Sup't.

## NEBRASKA INSTITUTE FOR THE DEAF AND DUMB, OMAHA, NEB.

No.	Sex.	Normal.	Large Jaw.	Protrusion Lower Jaw.	Protrusion Upper Jaw.	High Arch.	V-Shaped Arch.	Partial V-Shaped Arch.	Saddle-Shaped Arch.	Small Teeth.
59	Male.	46	2	4	10	21	...	1	...	...
39	Female.	29	1	2	7	9	..	1	1	1
98	...	75	3	6	17	30	...	2	1	1

Examined by T. D. Wilson, D.D.S. J. S. Gillespie, Sup't.



## ALABAMA INSTITUTE FOR THE DEAF AND BLIND, TALLADEGA, ALA.

No.	Sex.	Normal.	Large Jaw.	Protrusion Lower Jaw.	Protrusion Upper Jaw.	High Arch.	V-Shaped Arch.	Partial V-Shaped Arch.	Saddle-Shaped Arch.	Small Teeth.
49	Male.	...	10	...	7	15	10	...	...	10
34	Female.	...	...	...	..	...	...	...	...	...
83	...	...	10	...	7	15	10	...	...	10

Examined by Samuel H. Baird, D.D.S. Joseph H. Johnson, Sup't.

## INDIANA INSTITUTE FOR THE DEAF AND DUMB, INDIANAPOLIS, IND.

No.	Sex.	Normal.	Large Jaw.	Protrusion Lower Jaw.	Protrusion Upper Jaw.	High Arch.	V-Shaped Arch.	Partial V-Shaped Arch.	Saddle-Shaped Arch.	Small Teeth.
93	Male.	47	14	2	1	19	3	6	1	2
59	Female.	25	9	1	...	17	3	10	1	2
152	...	72	23	3	1	36	6	16	2	4

Examined by R. I. Blakeman. Eli P. Baker, Sup't.

## NEW JERSEY SCHOOL FOR DEAF MUTES, TRENTON, N. J.

No.	Sex.	Normal.	Large Jaw.	Protrusion Lower Jaw.	Protrusion Upper Jaw.	High Arch.	V-Shaped Arch.	Partial V-Shaped Arch.	Saddle-Shaped Arch.	Small Teeth.
44	Male.	27	1	...	4	4	4	6	2	5
44	Female.	26	1	1	5	3	5	5	2	3
88	...	53	2	1	9	7	9	11	4	8

Examined by Dr. T. S. Stevens. Weston Jenkins, Sup't.

## SOUTH CAROLINA INSTITUTE FOR THE EDUCATION OF THE DEAF, DUMB, AND BLIND, CEDAR SPRINGS, S. C.

No.	Sex.	Normal.	Large Jaw.	Protrusion Lower Jaw.	Protrusion Upper Jaw.	High Arch.	V-Shaped Arch.	Partial V-Shaped Arch.	Saddle-Shaped Arch.	Small Teeth.
23	Male.	20	1	1	1	1	2	1	...	2
20	Female.	15	...	1	2	1	3	2	2	2
43	...	35	1	2	3	2	5	3	2	4

Examined by Dr. J. T. Calvert. N. F. Walker, Sup't.

## WESTERN PA. INSTITUTE FOR THE DEAF AND DUMB, PITTSBURG, PA.

No.	Sex.	Normal.	Large Jaw.	Protrusion Lower Jaw.	Protrusion Upper Jaw.	High Arch.	V-Shaped Arch.	Partial V-Shaped Arch.	Saddle-Shaped Arch.	Small Teeth.
92	Male.	24	15	1	...	1	13	12	25	1
55	Female.	15	7	1	...	7	8	10	8	2
147	...	39	22	2	...	8	21	22	33	3

Examined by Dr. J. G. Templeton. John G. Brown, Sup't.

## COLORADO INSTITUTE FOR THE DEAF AND DUMB, COLORADO SPRINGS, COLO.

No.	Sex.	Normal.	Large Jaw.	Protrusion Lower Jaw.	Protrusion Upper Jaw.	High Arch.	V-Shaped Arch.	Partial V-Shaped Arch.	Saddle-Shaped Arch.	Small Teeth.
23	Male.	9	4	1	4	...	1	2	...	2
20	Female.	11	3	1	1	...	2	1	...	1
43	...	20	7	2	5	...	3	3	...	3

Examined by Robert F. Manders. John E. Ray, Sup't.

## NORTHERN NEW YORK INSTITUTE FOR DEAF MUTES, MALONE, N. Y.

No.	Sex.	Normal	Large Jaw.	Protrusion Lower Jaw.	Protrusion Upper Jaw.	High Arch.	V-Shaped Arch.	Partial V-Shaped Arch.	Saddle-Shaped Arch.	Small Teeth.
45	Male.	11	5	6	15	3	2	...	3	1
16	Female.	3	1	5	3	1	2	...	1	...
61	...	14	6	11	18	4	4	...	4	1

Examined by F. S. Danforth. H. C. Rider, Sup't.

## TOTAL DEFORMITIES IN THE JAWS OF THE DEAF AND DUMB.

No.	Sex.	Normal.	Large Jaw.	Protrusion Lower Jaw.	Protrusion Upper Jaw.	High Arch.	V-Shaped Arch.	Partial V-Shaped Arch.	Saddle-Shaped Arch.	Small Teeth.
1111	Male.	538	197	41	116	241	91	115	108	51
824	Female.	363	108	51	89	177	78	77	95	62
1985	...	901	305	92	205	418	169	192	203	113
Per cent.		45.3	15.7	4.7	10.5	21.7	8.7	9.9	10.4	5.8

Two cases cleft palate.

Examinations were made in the following-named institutions for the blind:

## MARYLAND SCHOOL FOR THE BLIND, 339 N. CHARLES STREET, BALTIMORE.

No.	Sex.	Normal	Large Jaw.	Protrusion Lower Jaw.	Protrusion Upper Jaw.	High Arch.	V-Shaped Arch.	Partial V-Shaped Arch.	Saddle-Shaped Arch.	Small Teeth.
29	Male.	12	3	3	3	12	1	...	5	3
36	Female.	20	...	3	...	12	...	2	5	...
65	...	32	3	6	3	24	1	2	10	3

Examined by Charles Collins Buck, D.D.S. F. D. Morrison, Sup't.

MARYLAND SCHOOL FOR THE BLIND AND DEAF AND DUMB, NORTH BOUNDARY AVENUE, BALTIMORE, MD.

No.	Sex.	Normal.	Large Jaw.	Protrusion Lower Jaw.	Protrusion Upper Jaw.	High Arch.	V-Shaped Arch.	Partial V-Shaped Arch.	Saddle-Shaped Arch.	Small Teeth.
13	Male.	5	1	5	2	...	...	...	...	1
5	Female.	3	...	1	1	...	...	...	...	...
18	...	8	1	6	3	...	...	...	...	1

A perfect "bite" was exceptional.

Examined by Richard Grady, M.D., D.D.S. F. D. Morrison, Sup't.

KENTUCKY INSTITUTE FOR THE BLIND, LOUISVILLE, KY.

No	Sex.	Normal.	Large Jaw.	Protrusion Lower Jaw.	Protrusion Upper Jaw.	High Arch.	V-Shaped Arch.	Partial V-Shaped Arch.	Saddle-Shaped Arch.	Small Teeth.
27	Male.	15	...	...	5	3	1	2	...	...
22	Female	12	...	1	4	2	2	1	...	1
49	...	27	...	1	9	5	3	3	...	1

Examined by Dr. Charles E. Dunn. Wm. Huntoon, Sup't.

NEW YORK INSTITUTE FOR THE BLIND, 9TH AVE. AND 34TH ST., NEW YORK.

No.	Sex.	Normal.	Large Jaw.	Protrusion Lower Jaw.	Protrusion Upper Jaw.	High Arch.	V-Shaped Arch.	Partial V-Shaped Arch.	Saddle-Shaped Arch.	Small Teeth.
38	Male.	21	4	1	...	5	2	1	1	3
37	Female.	17	8	2	...	4	1	3	...	2
75	...	38	12	3	...	9	3	4	1	5

Examined by Geo. A. Fournier, D.D.S. N. B. Walt, Sup't.

TOTAL DEFORMITIES IN THE JAWS OF THE BLIND.

No.	Sex.	Normal.	Large Jaw.	Protrusion Lower Jaw.	Protrusion Upper Jaw.	High Arch.	V-Shaped Arch.	Partial V-Shaped Arch.	Saddle-Shaped Arch.	Small Teeth.
107	Male.	53	8	9	10	20	4	3	6	7
100	Female.	52	8	7	5	18	3	6	5	3
207	...	105	16	16	15	38	7	9	11	10
Per cent.		50.7	7.7	7.7	7.2	18.3	3.3	4.3	5.3	4.8

One case cleft palate.

In the following table are shown the results of the examinations of the mouths of the insane:



No.	Sex.	Normal.	Large Jaw.	Protrusion Lower Jaw.	Protrusion Upper Jaw.	High Arch.	V-Shaped Arch.	Partial V-Shaped Arch.	Saddle-Shaped Arch.	Small Teeth.
430	Male.	394	10	4	2	18	12	29	3	5
270	Female.	226	8	6	4	26	14	18	9	2
700		620	18	10	6	44	26	47	12	7

Examinations of the mouths of seven hundred insane patients at the Cook County, Ill., Insane Asylum and the Illinois State Insane Asylum, as shown in the table, revealed the fact that only about 12 per cent. were irregular, the irregularities consisting of protrusion of the upper and lower jaws, partial V-, and very few saddle-shaped arches. The high arch was quite conspicuous among these people. Some of these irregularities were due to local causes. These irregularities were among cases of congenitally insane patients, or patients who had become insane early in life. These observations were not confined to the hereditary types.

With few exceptions, insanity does not appear in the individual until the skeleton has attained its normal development. There were irregularities of the teeth produced by local causes. It is probable that a large percentage of constitutional irregularities of the teeth could be found in the mouths of inmates of our private asylums, where there are more hereditary cases.

It has been suggested by Dr. Coles that high vaults and cleft palates are associated. It is doubtful if this can be proven. Out of 1977 idiots 318 had high vaults, and there was but one case of cleft palate. Among 2142 deaf, dumb, or blind persons, there were 255 high vaults and only three cases of cleft palate. This small percentage would indicate that this lesion is not inherited nor developed with the osseous system, but is merely an accident and local in its origin.

The high arch or vault observed among idiots, and also observed, though perhaps not so frequently, among normal persons, cannot be considered a deformity or irregularity of the jaw, although where present it furthers the production of irregularities of the teeth. This peculiar formation of the roof of the mouth was seen closely allied with the V- and saddle-shaped arches, and many that have given thought to this subject, especially Dr. Ballard, have believed it a part of the deformity, and that it was produced by the pressure of the thumb or finger in the roof of the mouth. I have examined a number of children while they were sucking the thumb or finger, and have never found that they reached the roof of the mouth. If it were possible for the high arch in the anterior part of

the mouth to be produced by pressure of the thumb or finger, how can we account for the high arch in the posterior part of the mouth when the position is such that the thumb or forefinger cannot reach it without considerable exertion? Some of the arches are higher at the median line, others at either side of the median line, while still others are high, broad, or flat, showing that they could not be produced by sucking a foreign substance.

I venture the opinion that the high arch is a natural development of contour in harmony with the other bones of the face. It is produced in connection with the eruption of the second teeth, and with the development of the facial bones, by the elevation of the vault on the one hand, and the elongation of the alveolar process on the other. This is seen generally in connection with long, thin faces, and long, thin jaws, necks, and limbs. It is connected with the typical shape of the American face, and is not so often seen in foreigners.

Irregularities of the jaws and teeth, as the V- or saddle-shaped jaws, are not confined to the high vault; they are frequently seen in connection with the medium or low vault. The high vault, as has been mentioned, aids in the production of irregularities. The alveolar processes are thin and long, affording feeble resistance to the pressure of the teeth as they force their way into the arch. The thin alveolar process gives way, and either the V- or the saddle-shaped jaw is produced.

The percentage of small and large teeth is small. The teeth, unlike the other tissues of the body, develop from the periphery, their development beginning as early as the sixth week of intra-uterine life. Calcification sets in immediately, and the shapes and sizes of the teeth are determined while the surrounding tissues are yet soft. The calcific material, which is first deposited on the outer surface, protects the inner part of the tooth-structure, and unless some constitutional disturbance like eruptive fevers, or an inherited diathesis, impair nutrition, the teeth will develop normally. Generally speaking, the teeth are of the same sizes to-day that they have been for ages. When teeth are unusually large or small they may be accounted for as an inheritance.

I have described the condition of the jaws and teeth that are not intimately connected with the three general pathological and physiological abnormalities of the jaws already mentioned, viz.: excessive development, arrest of development, and inharmonious development of the bone-tissue. The feeble-minded patient affords ample opportunity for the study of these abnormal conditions and of bone-tissue. The text-books describe these conditions but meagerly, and the profession generally speak of all enlargement of tissue as hyper-

trophy, and of all tissue not strictly up to normal as atrophied. The different causes of these conditions are not sought after, nor are they well understood.

When excessive development of the jaws exists, the circle of the jaw is larger than the arch of the teeth. The teeth are seldom irregular under these conditions. This inharmonious development prevents the proper articulation of the teeth. Excessive and inharmonious development is seen less frequently than arrested development. This is due to lesions of the nerve-centers, to constitutional diseases such as syphilis, scrofula, rickets, to race-crossing, climate and soil, and early extraction of the teeth. The result of arrested development of the jaw is that the arch of the jaw is smaller than the arch of the teeth, and consequently the teeth are irregular; the principal types being the V- and saddle- and kindred-shaped arches.

The above statistics indicate that irregularities of the teeth follow neurotic lesions as a natural result.

Any disturbance of the function of nutrition naturally affects the osseous system. Kingsley and others, including myself, have seen that some of the lower grade of idiots, deaf, dumb, or blind, possess well-developed jaws and teeth. It is a fact admitted by all pathologists that under certain environments the tissues of the body develop abnormally, notably so in the osseous system. When this is the case, large jaws and regular teeth are sometimes seen.

For confirmation of this conclusion, see DENTAL COSMOS for 1888 and 1889.

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### FLASKING DENTURES FOR VULCANIZATION.

BY W. STORER HOW, D.D.S., PHILADELPHIA, PA.

IN the production of the best attainable vulcanite dentures, there is probably no more important step in the process than that of flasking the cases for vulcanization.

Due consideration of the nature and behavior of vulcanizable rubber or other like material in which sulphur forms so large a component part is an important preliminary to the preparation of the mold in which the material is to be confined while being vulcanized.

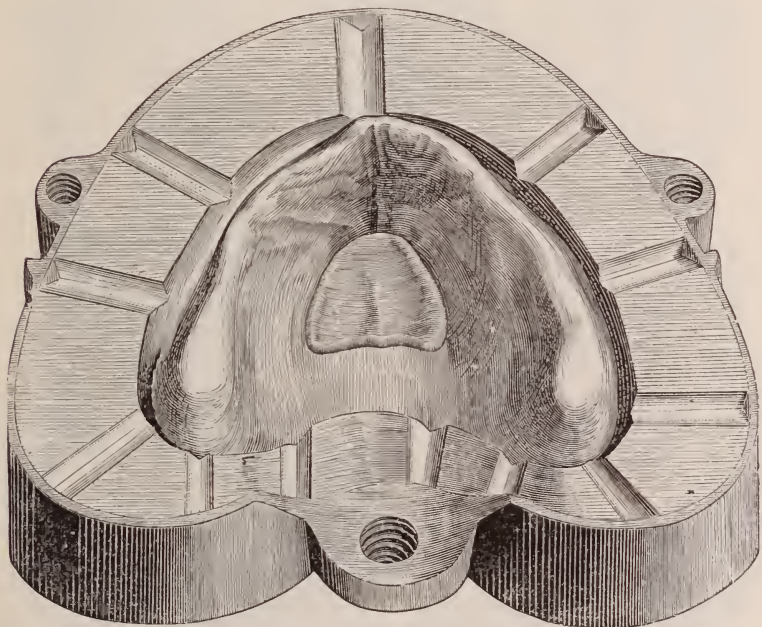
Dr. George B. Snow, in the four successive numbers of the *Dental Advertiser* for 1887, has ably treated the subject of the "Physical Properties of Vulcanite," and shows that vulcanizable rubber expands when heated, and shrinks when cooled after vulcanization. He says, "There are then two shrinkages to be taken into account in vulcanite,—one inherent to its production from the compound of crude India-rubber and sulphur; and another, in common with most



other substances, from changes of temperature. The two combined are the secret of many of the annoyances experienced in making vulcanite dental plates, from failure to secure proper adaptation."

That whole subject will not at this time be discussed, but only some practical points presented in relation to flasking; and here it is necessary to differ not only with Dr. Snow, but with most other writers and practitioners who have followed Dr. Wildman in making radial grooves, or gates, for the outflow of the excess of rubber. These gates are faulty in fact and in principle, whether made in the model half of the flask as shown in Fig. 1, or in the teeth-half of the

FIG. 1.

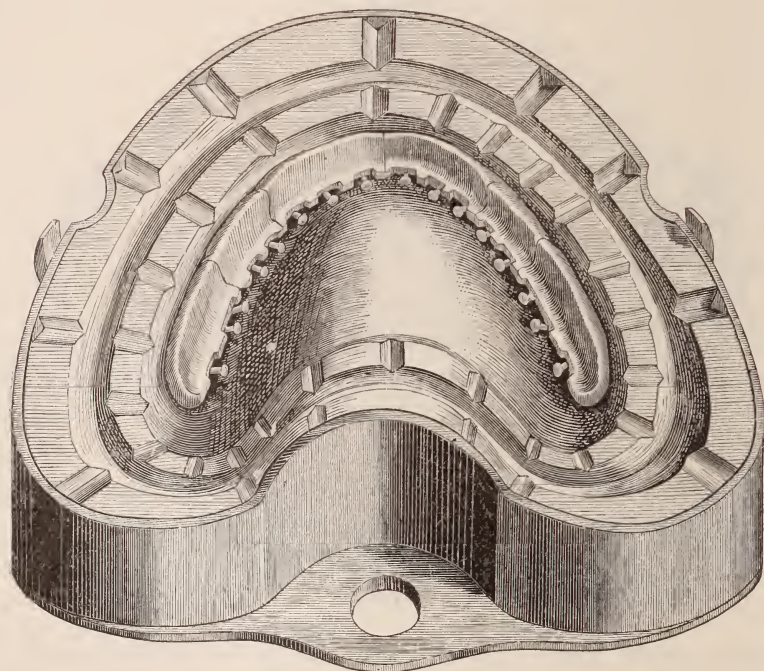


flask as seen in Fig. 2. The illustrations are taken from Wildman's "Instructions in Vulcanite," published in 1875. The annular groove shown in Fig. 2 is suggestive of the proper mode of providing a receptacle for the excess, but the radial gates really defeat the true objects in view by affording too free an escape of the softened rubber, thus preventing that condensation of the inclosed material which is necessary for the production of the best results.

It is more convenient to form the annular groove in the teeth-half of the flask, but, for reasons which will presently be given, it is preferable to cut the groove in the model-half as is shown in Fig. 3. The groove should be ample in width and depth, and should be beveled from its bottom to within one-sixteenth of an inch of the gum and

palatine (or lingual) border. The like surface next the flask should be slightly and evenly scraped to bevel it towards the groove, so that the two parts of the flask will come closer together than at first by about the thickness of a sheet of No. 10 foil, the object being to compensate for the very thin septum of vulcanite which will usually be made at the gum-border when the flask is finally closed, although by nice manipulation alone the septum may be reduced to the thinness of tissue-paper. It is however better to omit the scraping if it cannot be done with such evenness and delicacy that only a slight and uniform portion of the surface shall be removed. A vulcanite

FIG. 2.



scraper, shaped as shown in Fig. 4, is suited to the proper formation of the groove and the scraping of the plaster investment.

Prior to the formation of the groove and the scraping just mentioned there should be clearly in the mind of the manipulator the conviction that it pays to patiently wait for the hardening of the plaster investment before beginning to cut and scrape, because the parting edge of the groove at its gum-border should be as narrow as the strength of the plaster will permit.

It pays also to consider the character of the gum-outline, and so set the model in the flask and trim the investment that the surface

of the teeth-half shall slope up relatively to the gum-border, in order that the pressure of finally closing the flask shall not under any circumstances jeopardize the thin porcelain blocks. An excellent

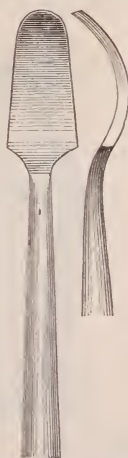
FIG. 3.



method for making close joints is to grind the section sides to fit squarely in front and bevel slightly half-way to the front from behind until they are nearly in the exact relations desired. Then while still in the wax, press the edge of a knife-blade into the joint to separate the sections evenly a very little distance. A thin diamond disk rapidly revolved in the dental engine hand-piece may then be steadily passed dry through the joint and simultaneously cut both section sides true and parallel, so that a square tight joint along the gum faces of the sections will be insured. In fact, a large diamond disk jointer will be found to be of great value in the laboratory.

At this point it may be well to say that in waxing up porcelain sections the gum-edges should be slightly beveled, and the wax overlap the bevel but a very little, so that the contraction of the vulcanite in cooling shall not pull the section inward with a force that even steel could hardly resist if provision were not made for the sliding of the vulcanite on the beveled edge. The jointing of the sections should for the same reason receive careful attention and be

FIG. 4.





made square-edged, with inward bevels to form grooves for the reception of little pencilings of oxyphosphate cement before packing the rubber, which will thus be kept out of the joints.

FIG. 5.

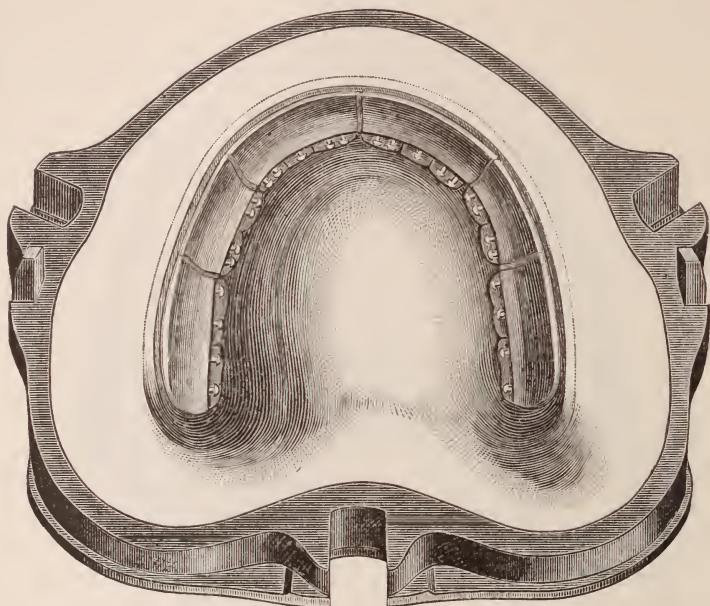
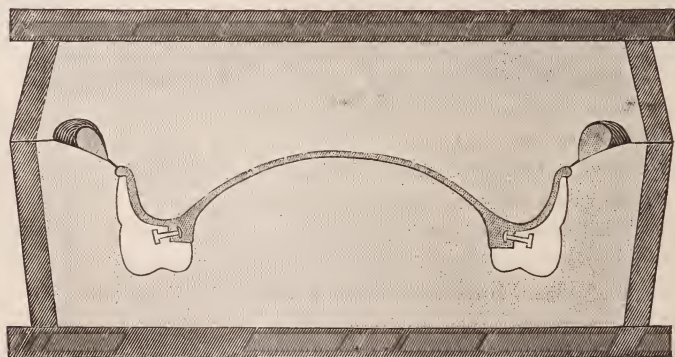


Fig. 5 discloses the appearance of the teeth-half of a properly filled flask containing gum sections. Attention is directed to the upward flaring of the parting or separating surface as it recedes from the

FIG. 6.



gum-border. This configuration is designedly obtained by the peculiar setting of the model previously described with reference to Fig. 3, and is made more apparent by the sectional view of the closed

flask, Fig. 6. This view was suggested by Dr. E. T. Starr, who in other ways has aided in the presentation of this article. These three illustrations will serve to make clear the practical and theoretical differences between this method of flasking and the old mode shown by Figs. 1 and 2. In Fig. 5 the beveled joints of the sections are seen to be protected by cement as before mentioned, and the teeth are assumed to have been thoroughly cleansed from the base wax by the pouring of boiling water over them, and then allowing them to become quite dry. Neglect of this precaution is a common cause of the failure of the vulcanite to closely fit the teeth, because of the intervening film of water. Both halves of the flask are then carefully warmed to about 200° F., and so slowly as to heat the plaster all through without making it hot enough to harden the surface of the rubber. This is then taken from a warm (not hot) slab or plate and packed in the teeth-half of the flask (Fig. 5). A piece of thin muslin wet and then wrung almost dry is placed on the warmed model-half (Fig. 3), and the flask nearly closed under slow pressure. The halves are then separated, the cloth stripped carefully from the rubber and the excess cut away with a sharp knife or narrow-blade scissors, first wiped on the damp cloth, or, better, rubbed with the finger touched by glycerin. The flask is again closed, immersed in hot water, and gradually and evenly screwed into close contact; preferably in a spring clamp similar to that of Dr. Donham.

Vulcanizing is best done by moist heat at a little above 300° F., continued for about two hours; but whatever the heat and time, the plaster in the flask should be made quite cool before beginning to remove the denture.

If the prescribed process shall have been precisely followed, the resulting vulcanite will be dense, fit the teeth and model closely, and preserve thin porcelain sections entire, because the expansion of the heated rubber will have been restrained by a gradual restriction of the outflow, which, as the flask-halves are brought closer and together, is less and less free to flow over the narrow border, until at last only a thin septum of rubber there remains, and the inclosed denture rubber is consequently compressed at the moment of its completed softening.

The subsequent shrinkage due to a change of its component parts under the action of continued heat is thus in some measure compensated by the compression just alluded to; and this compression is made general and equal by the taking place of the outflow at every point of the peripheral narrow border, coupled with its regularly decreasing freedom of outflow up to the time that it entirely ceases to flow.

The second shrinkage, or, more correctly speaking, the *contraction* due to the cooling of the vulcanite, is rendered in great degree harmless by the sloping shape of the narrow septum between the denture and the thick ring of excess, which while in process of contraction will merely dish the thin conical septum or diaphragm, without disturbing the shape of the denture, as is obvious on carefully noting the shapes and relations of the parts in Fig. 6, which shows them in cross-section after vulcanization and before the flask-halves have been separated.

Certain advantages are obtained by allowing the cooled flask after the vulcanization to remain unopened over night, or at least for several hours. A molecular accommodation of an annealing character thus occurs, with a consequent diminution of liability to warp the plate or to break the porcelain sections. The long-continued retention of the denture on the model within the flask tends also to keep the plate in shape until its form becomes permanent; whereas a quickly cooled and immediately finished denture will not seldom surprise the dentist by unaccountably changing shape, or by showing cracks in the gum sections; in fact, either of these serious defects may result after the denture has been hastily finished and the patient dismissed only to return in a few days with dissatisfaction, because of the meantime occurrence of the defects. It is worth while to take time to save time.

The flasking of plain teeth for full or partial upper or lower dentures may be accomplished in substantial accordance with the method described, which also facilitates facing with pink or other vulcanizable imitations of the natural gum.

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### CAMPHO-PHÉNIQUE.

BY J. FOSTER FLAGG, D.D.S., PHILADELPHIA, PA.

THE rapidly-developing importance of this peculiar combination of carbolic acid and camphor impels me to a presentation of its especial claims as, probably, the most remarkable medicament which has ever been offered in connection with dental therapeutics.

When it is known that it is a notable germicide, an efficient antiseptic, a non-irritant, a decided local anesthetic, non-poisonous, insoluble in water or glycerin, does not discolor or stain, is possessed of an agreeable odor and not disagreeable taste, and maintains an unchanged integrity, it will at once be recognized as wonderfully adapted to a large proportion of all dento-pathological conditions, from sensitivity of dentine, through the varying conditions of pulp-irritation, pulp-devitalization, pericemental irritation, alveolar ab-



scess, and caries or necrosis of contiguous osseous structure, and that thus it must rank as one of the most, if not *the most valuable* polychrest which dentistry possesses.

During the past session of the college with which I am connected (since September, 1888) I have availed myself of the extended opportunities afforded for a decisive clinical record of this material, and the results have been so gratifying that it is with much satisfaction that I present its claims to recognition and urge a prompt acceptance of the many benefits it has to bestow.

Where cotton is indicated as a wedge, and especially where marked sensitivity of dentine exists in connection with such cavities between teeth, both the discomfort attending separating and the pain attendant upon subsequent preparation of cavities are largely, and frequently completely, abrogated.

In cases of pulp-irritation, even of severe grade, its application, upon cotton, will almost invariably demonstrate its high rank as a "pain-obtundent."

In devitalization of pulps its use as the menstruum for the arsenic and acetate of morphia in our "devitalizing paste" seems to have already given evidence of its value as a local anesthetic in that connection. As a disinfectant of tissue surrounding pulp-cavities and canals which have contained putrescent pulps it has made an excellent record, and has proven itself, by its variety of peculiarly acceptable attributes, to be one of the very best applications we have ever had for the purpose.

As a medicament, or ingredient of medicaments, for canal-dressings, either temporary or *permanent*, upon cotton, its combined characteristics of *antiseptis* and *insolubility* must command favorable recognition.

As an antiphlogistic in the earlier stages of sthenic pericementitis, applied upon the gum with small pads of muslin and renewed with *only desirable infrequency*, it has oftentimes been able to produce the attempted resolution; and, in cases where this was found impossible, to largely mitigate the suffering attending the induction of suppuration.

As an antipyrogenic, used by injection into fistulæ, either in full strength or diluted by fluid or viscid cosmoline or lanolin, it has produced eminently satisfactory results in some markedly discouraging cases.

It will thus be seen that, from the dental stand-point, campho-phénique is a medicine which it behooves us to test thoroughly; that if it shall be found to perform even a portion of the good offices which it so largely promises, suffering humanity shall promptly rejoice over this additional assuager of some of its many ills.

Although intimation of other uses than those pertaining strictly to dentistry might here be regarded as irrelevant, yet so many phases of trouble, such as wounds (cut or contused), burns, sprains, intolerable itchings, etc., are so decidedly relieved by applications of campho-phénique (either pure or diluted), that I feel sure that those unfortunates who may chance, through such mention, to find relief from these inflictions cannot but feel grateful for this information.

Campho-phénique is stated by its manufacturers, The Phénique Chemical Company of St. Louis, to be a definite chemical compound, having a formula  $C_8H_{11}O$ , and thus, "for obvious reasons," it has had given to it the name under which it is presented to the healing professions.

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## PROCEEDINGS OF DENTAL SOCIETIES.

### NEW YORK ODONTOLOGICAL SOCIETY.

THE New York Odontological Society held its regular monthly meeting in the New York Academy of Medicine, No. 12 West Thirty-first street, Tuesday evening, April 16, 1889.

The president, Dr. J. Morgan Howe, in the chair.

#### INCIDENTS OF OFFICE PRACTICE.

Dr. S. C. G. Watkins. I was much interested this winter in reading, in the Transactions of the American Dental Association, the statement of Dr. Peabody, of Louisville, in regard to filling root-canals with lead, and in that way curing abscesses which he could not cure by other methods. His remarks elicited quite a discussion pro and con, and there seemed to be considerable interest taken in the subject. After reading the article, a case presented itself which seemed good for a trial of the method. It was the case of a lady who was much run down, she having been suffering with neuralgia about a year, and after being in the hands of different dentists and physicians had at length been ordered South to seek relief. She lost her memory for a time through the suffering, and almost lost her mind. When she came to me I found a second bicuspid on the right side with a cavity in it, which was exceedingly sensitive, and the tooth tender to the touch; also the second bicuspid on left side, with no cavity, but quite tender to the touch. I diagnosed a congested pulp in each tooth, and opening them through the grinding-surface I put in arsenic and killed the pulps, which I afterward removed. Inflammation set in, and continued after the pulps had been removed, the teeth remaining sore. I drilled the canals out with a small Morey drill and carried disinfectants on silk floss to their extremities,

and packed them tight. The soreness continued. After ten days I opened them and kept them open for a little time, then filled them again in the same manner. I did that three times, at intervals of about ten days, but the soreness continued, the teeth being so sore that the patient could not bear any pressure upon them. It seemed to me the strangest case that I had ever encountered. A week ago Thursday the lady came in with the teeth still very sore, and I determined to fill the ends of the canals with lead,—which I did, and, filling the rest of the canals with gutta-percha, dismissed the patient. She afterwards reported that the soreness was nearly gone the second morning after the operation, and before night it had entirely disappeared. To-day I put in gold fillings, the teeth being entirely well. I give you the case for what it is worth.

Dr. S. F. Howland. What form of lead did you use for filling the roots?

Dr. Watkins. Simply a piece of sheet-lead, in the form of a cone, pressed up to the end of the canal, and then broken off at a little notch I had cut around it.

Dr. Perry. What action was expected from the lead?

Dr. Watkins. It was stated, in the article I have referred to, that the lead had antiseptic properties and was beneficial in that respect. I simply followed the example.

Dr. Sudduth. There can be an answer given, and a scientific answer at that. My experience leads me to believe, beyond question, that the ultimatum of treatment and success in such cases is in closing the apical foramen, and thereby preventing infection through it to the tissues beyond. The pericementitis arose from the continued infection in the root-canal; and if the canal had been thoroughly disinfected, dried, and filled with oxychloride of zinc, or any other preparation that would have solidly filled the canal and closed the apical foramen, the pericementitis would have subsided the same as it did after the stopping with lead. The lead made a perfect stopping, thereby preventing further infection, and the disease cured itself.

Dr. Perry. I understand that arsenic was applied to kill the pulps.

Dr. Watkins. I applied arsenic, then removed it after two days. The tooth was sore and the face swollen before the pulp was removed.

Dr. Sudduth. The tooth was affected at the time beyond question, and the further and increased inflammation was the result of infection.

Dr. Watkins. The canals were filled with silk floss, dipped in pure carbolic acid and iodoform, and carried to the end of the root and packed solidly. I should think that would prevent any infection through the foramen.



Dr. Sudduth. I would like to ask Dr. Watkins whether in the various operations upon these teeth he used the rubber-dam?

Dr. Watkins. I did use a rubber-dam, as I do in nearly all cases.

Dr. Sudduth. That is absolutely necessary, it seems to me, to prevent the ingress of saliva. The philosophy of the treatment is rational, and should consist in stopping the canal and the foramen, no matter whether it be done with gutta-percha or oxyphosphate or lead, so as to prevent any further ingress or egress of infection. It has been said that infection will pass through the canals of teeth and reach the tissues beyond when they are filled; but the fact that when dressings which have been in such canals for years are taken out they still retain the odor of the creasote, or other material used in dressing, shows that there is very little interchange between the canal of the tooth and the tissues outside of it, and the only way infection can pass from the canal of the tooth beyond is through the apical foramen; and the rationale of treatment is, therefore, to close the foramen by whatever means we can effectually do it.

Dr. Bogue. I do not know that it is worth while to enter into a discussion of this subject just now; yet there are one or two points, a little remote from that which Dr. Watkins has brought up, upon which it may be well enough to say a word. It seems to me that the application of arsenic to an inflamed pulp, as Dr. Watkins describes, was a little premature. The inflammation might have been gotten rid of either by time or by the application of pure carbolic acid; and then instead of enlarged blood-vessels which carried the arsenic to the apical foramen, and perhaps further, the action of the arsenic would have ceased before it reached that point, and a slough would have formed. At the end of eight or ten days the slough would have separated and might have been taken away. Then the treatment that Dr. Sudduth calls hermetical sealing would prevent further trouble. But Dr. Sudduth forgot to mention the fact that the apical foramen may be sealed with dry cotton as a temporary filling just as well as the bottles containing bacterial cultures, and it would be as efficient as lead, only it should not be left as a permanent filling.

The President. Gentlemen, I have the pleasure of introducing to you Dr. Ingersoll, of Keokuk, Iowa, who is our essayist and honored guest.

Dr. L. C. Ingersoll. Mr. President and Gentlemen of the Odontological Society: I can assure you that it gives me very great pleasure to meet you here. I esteem it an honor to address the society that I have for so many years regarded as the most intellectual and most critical society in the world. But I must say that I come before

you with a great deal of confidence and the full assurance that I shall disappoint you. You do not know why, but I can tell you why in a very few words. I was fortunate enough ten years ago to be invited to read a paper before this society, and I did so under very peculiar circumstances. I succeeded in preparing what I thought was a pretty good paper, and the society also seemed to think well of it, for I have received no less than three urgent invitations at intervals since that time to read a paper before this society on the *same subject*, the two first of which I was obliged to decline for lack of time. The letter which I received last fall from an officer of this society informed me that some of my views had been under discussion here, that there was a difference of opinion with regard to my exact meaning, and asked if I could not explain myself a little more fully and give the society a paper on the *same subject* as that of ten years ago. So I am not responsible for the subject of the paper for this occasion. If I repeat myself I shall be sorry for it, but you will have to take it. The reason I have for feeling sure of disappointing you is this: I wrote that first paper under very great pressure, and I put my whole force into it. I had prepared a paper for the American Dental Association. It chanced to be the first time I ever appeared in that society, and I volunteered a paper criticising very decidedly the uniform practice of capping pulps. The criterion for judging of a man's fitness for the practice of dentistry then was whether he capped pulps or not, and there were suggested about as many different methods and varieties of material as there were members of the profession. I criticised the methods and questioned the success of the operation; and I gave, as one of a number of reasons for disapproving of it, the fact that the profession overestimated the value of the dental pulp in its relations to the other tooth-tissues. I deemed that it was not of such value as commonly thought to be, that the other tissues could be preserved, and that the tooth could survive the death of the pulp. When I sat down more than half a dozen men rose to their feet, representing different sections of the country. Kentucky rose first. What did Kentucky say? "Does not the gentleman know that when the pulp of a tooth is destroyed the tooth speedily disintegrates and crumbles?" Next came Philadelphia, represented by a professor in a college, and said, "The gentleman reminds me of one who used to come into our society in Pennsylvania and call in question doctrines and principles of practice long ago settled, for no other reason than to provoke discussion." Then Tennessee came to the front, with the energy, strength, and boldness with which you know Tennessee moves, and said, "I consider the paper an insult to the intelligence of the dental profession. Does the gentle-

man suppose that we are ignorant of the results of our own work?" Then came Philadelphia again, and said—well, let that pass by. I found myself in the midst of a hornet's nest right away. A friend came to me and said, "Ingersoll, are you not going to reply to these men?" I said, "No, I have nothing to say *now*; there is too much heat, too much fire here; but I am going to answer them some day; I cannot do it now." I was querying in my own mind whether that society would accept another paper from me. I got that one in as a volunteer paper; and thought I, that is the last paper they will ever let me read in the society. But as good fortune would have it (and I must thank the Odontological Society), when I reached home I found a formal letter from your executive committee, urging me to write another paper on the subject. I considered it a lucky thing that a paper was wanted in which I could answer the various criticisms upon my first paper. I sent back word, however, that I could not write the paper immediately, but intended at some future time to do so, and on further solicitation from the committee I promised the Odontological Society the paper whenever it was completed, for, I said, "your papers are read everywhere, and I shall be very glad to have my paper go forth from your society." It was under those circumstances that I prepared that paper ten years ago. I put my whole soul and strength into it. I had no such stimulus in preparing this paper. You agree with me now. The whole profession was against me then. One man said in that meeting of the association, "I save four-fifths of exposed pulps alive." Another said, "I save nine-tenths." And rising higher and higher in boasting of success, one said, "I save ninety-nine in a hundred." I replied, "Would that the gods would give to some man the grace, patience, and skill to save ninety-nine and a half in a hundred." With all that pressure of opposition upon me I wrote my paper ten years ago. Within three or four years after that I had the pleasure of finding that the profession generally agreed with me. They had yielded the point. So I have nothing now to stimulate me to fight as I had then, and I think my paper will be tame in comparison with the one I had at that time, and which was the basis of your inviting me here on this occasion.

My subject is "The Relations of the Dental Pulp to the other Tooth-Tissues."\*

Dr. Ingersoll. I am well aware, Mr. President, that the paper is pretty long, but if you only knew how much I left out of what I first wrote you would be very thankful. I am quite conscious that

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\* Dr. Ingersoll's paper will be found at page 497 of this number.—ED. DENTAL COSMOS.



there are objections to several points that I have presented, and for the purpose of answering those objections I wrote to my friend, Dr. George McCausey, of Janesville, Wis., who is an accomplished student of histology and a good worker with the microscope, asking him to send me his objections and views on the subject; and he very kindly sat down and wrote out very fully and thoughtfully his objections. It is a pretty formidable array, too, I admit. I intended to take those objections up and answer them in this paper, but I have spared you that. Dr. Sudduth is here, and he is probably capable of making the same objections that Dr. McCausey made, and if he is so disposed I hope he will present them. I want to hear all the objections that may be offered. If I can answer them, all right; if I cannot, my views will have to go for what they are worth.

The President. Gentlemen, Dr. Ingersoll's very interesting paper is before you for consideration. Please discuss the subject promptly and fully, for the paper is worthy of your best attention.

Dr. Bogue. I should like to ask what objection Dr. Ingersoll has to the term "dental fibrillæ"? I understood him to make an objection to that term merely as a matter of nomenclature.

Dr. Ingersoll. They are not dental fibrillæ: that is why.

Dr. Bogue. Does not the same objection extend to the term "cranial contents"?

Dr. Ingersoll. I should say that "cranial contents" simply means the contents of the cranium. To call these "dental fibrillæ" is to convey the impression that they belong to the dentine. Dental fibrillæ—fibrils of the dentine: one is Latin and the other English, both meaning the same thing.

Dr. Bogue. It was not to cause a strife, but to know the ground on which we stand, that I asked the question. Dr. Ingersoll surprised me somewhat to-day by expressing the view that the dental pulp was regarded as an independent thing from the fibrillæ occupying the dental canals. I never heard that idea expressed before. And when, later on, he alludes to the destruction of the pulp by arsenic, or any other corrosive agent, and its removal, he justly calls attention to the large number—some two hundred and fifty thousand dental or dentinal fibers, or nerve-fibers—that still remain in the dentine. If that is a true view, and I believe it is, I think he has hit upon one important point to have elucidated here now: what treatment to apply to antisepticise completely those fibrils. And it brings us closely to another question which he referred to in conversation a few hours since,—the advantages that are obtained in our use of obtundents; and once again I asked a question, whether the greatest sensibility of the nerves does not lie in their peripheral extremities. Dr. Ingersoll replied that it did; not only

in the finger-tip with which the blind man reads, but upon the surface of the eye, and upon the surface of the dentine immediately beneath and contiguous to the enamel. In the text-books it has been stated that the nerve-fibers have not yet been seen to pass through the dentine. If I am wrong, Prof. Heitzmann will correct me. We know the office of the dental pulp; we know of the presence of this net-work of nerves underneath the enamel; we know of the commencement of the dentinal fibrillæ, and their passing from the pulp outward into the dentine, but we do not see them pass all the way.

I desire to render my thanks to Dr. Ingersoll for his paper this evening. But one little criticism more comes to me. He has not yet told us of the gradual retraction of this pulp, or dental nerve, to a point where it is no longer serviceable in the economy. I do not gather, from what he has told us, at what age he considers the office of the dental pulp to have ceased. I shall be very thankful if he will let us know that. The exposure of a pulp in a person of twenty years would seem to me to be a very different thing from the exposure of the same pulp in a person of fifty years.

Dr. Ingersoll. That must be the case always. There is such a great difference in the period of full development in different individuals that there can be no line drawn or time stated. Ten years after the emergence of the tooth in one mouth would be equal, perhaps, to fifteen years in another; so we cannot tell. But there is a period certainly when the teeth arrive at the stage and attainment of complete function. We regard any organ as complete when it is capable of performing its normal function. I have not been able to fix any particular age, but must assume that there is a period when the teeth are complete, and then the formative organ becomes dormant; not dead, not lifeless, but in a condition to be aroused to activity again when circumstances demand it for formative work. Just at what period of life that dormancy takes place I do not know. I am in the habit of thinking that at ten years after complete emergence, where there is good development of the structure, a tooth may be considered as complete. But we do not know just what the period is, because there is such a difference in physiological processes in different mouths.

Dr. Perry. It seems to me that there is a point in that connection which is worth considering. I have many times questioned, in observing these cases, whether the death of the pulp would not have some effect in checking the condition that we call the senile condition, which, according to Dr. Heitzmann, if I understand him correctly, is a return to the embryonal condition. Assuming that a tooth had reached its maximum of density at say forty or forty-

five years of age, and the pulp being destroyed, the question is whether that tooth might not be, after all, even more lasting than it would have been if the pulp had remained alive. If the pulp were destroyed in early life, the tooth surely would not last as well. The whole question of pulp-destruction is one that hinges upon the age at the time. In young persons I should try to keep the pulps alive; in adults or middle-aged persons I should be more indifferent about it. It seems to me that Dr. Ingersoll struck upon a very important point when he called attention to the necessity of giving greater care to the contents of the dentinal tubuli. We do not do our full duty in the care of teeth which we devitalize if we simply remove the so-called pulp and fill the canal. There is a large proportion of organic matter in the tubuli, and if we have no means of getting it out we yet have means of mummifying and rendering it harmless. After thoroughly drying the tissue, we should use such antiseptics as will have this effect before the root is filled. I think that is a point of very great importance which has not generally been properly attended to.

Dr. Carl Heitzmann. Mr. President, the essayist reminds me of a learned rabbi who, in the last century, began to think of what was to his mind a very important topic,—that is, what becomes of the light when we extinguish the candle? He could not help writing a book on that topic.

The doctor draws attention to the insufficiency of our nomenclature, and suggests that it be changed, but he is far from offering anything better than we have. On the contrary, all that he told us shows that he has not studied much with the microscope. He objects to the word "pulp." Every one will admit that "pulp" is a poor word, and does not mean anything; but if he thinks the term "dental nerve" should replace that of "pulp" he is very much mistaken indeed. There are nerves in the pulp in great quantity, unquestionably, but there are a great many other things besides. There are myxomatous connective tissue and blood-vessels; so it would not be proper to call the pulp a nerve. It has been proven under the microscope that nerves exist in the pulp, but they are by no means alone there. The doctor objects to the term dentinal fibrillæ, because, in his opinion, they are offshoots of the pulp; and as the pulp is a nerve, therefore the dentinal fibrillæ must be nerves too. A bright man—the elder Tomes—expressed this idea a good many years ago. And he was right in a measure, but, as Dr. Bogue has remarked, nobody has yet traced the connection of the dentinal fibrillæ with the nerves of the pulp. We all admit that there are nerves in the pulp, but that the dentinal fibrillæ are nerves we are not yet warranted in believing. Is it not enough to say that there is



living matter in the pulp, which in one instance forms connective tissue and in another instance nerve-tissue? These forms of tissue differ only morphologically. If we were to assume this idea, is it not easy to say that the life of the dentine is located in the dentinal fibrillæ? Can any one tell the difference between pure living matter and nerve-tissue? Nobody can.

The doctor has an idea that the indestructibility of the inorganic material of the dentine may be imparted to the organic material, and *vice versa*. Again he is mistaken. The organic basis of the dentine is a gluey substance, whereas the real living part is a soft, jelly-like matter. If the pulp is extracted or destroyed, to be sure, the living part is destroyed and the tooth deprived of its vitality. Unquestionably the organic matter may remain unchanged in its form, as we see in the teeth of antediluvian animals that have been buried in the ice for many centuries. The form is preserved, but not the life. Life is attached to a substance of its own, and this substance is of a soft, gelatinous nature, being held in a glue-yielding basis-substance that is saturated with lime-salts.

The doctor claims that there is no reaction in dentine. He is mistaken again. The dentine in dead teeth is different from that in living ones. We know that in all cases when a foreign body is introduced, such as every filling-material is, a new mass of secondary dentine will be formed in the living human teeth. We know that if a gun-ball penetrates an elephant's tusk in life, there is set up around that ball a severe reaction, leading to the production of osteo-dentine. If we destroy the pulp, unquestionably we destroy the vitality of the dentine to such an extent that reaction will not take place. Exactly where the life ceases nobody can tell. We are aware of the fact that a certain amount of life is imparted to the tooth after the destruction of the pulp, through the pericementum or the peridental membrane, and we are prepared to understand that there is a gradual diminishing of life from the periphery toward the center. There is no abrupt line between the absolutely dead and the absolutely living parts, but a gradual fading from the one to the other. Whether that is uniform in all teeth after the destruction of the pulp is a mooted question which no microscopist can solve. A certain amount of life may remain in a tooth after the pulp is killed; but to say that the destruction of the pulp is therefore of little importance is a bold assertion. I am not a dentist, and simply judge from what I have seen under the microscope; but I should say that to destroy pulps in the teeth of young persons—the ages have been given correctly by Dr. Perry—before twenty to thirty years is malpractice, and the man who does it without absolute necessity is, as Dr. Atkinson would say, a criminal. In per-

sons of forty or more years of age it is an entirely different operation, and probably does not amount to much; still the pulp should always be saved when possible. Why? The doctor has alluded to an important duty of the pulp, even in advanced age, and that is the formation of secondary dentine. When the teeth are ground off by mastication or other causes, the pulp will produce secondary dentine for their protection; a certain amount of its tissue is transformed into secondary dentine, which gives ample protection, not only against pain, but infection as well. This office alone would be worth the saving of all pulps that can be saved. Nevertheless, every practitioner knows that a tooth may remain serviceable for years, or forever, after the destruction of the pulp. I have in my mouth several teeth without pulps, and I must say they do their duty; at least I am satisfied with them, and hope they will never bother me again. But yet pulps should not be recklessly destroyed. If a genius were to come and say he would ruin the whole dental business by destroying all the tooth-pulps, and that consequently there will be no more pain, and no money for the dentists, I am quite sure he could do a great deal of good, and a great deal of mischief also. Nature never does anything without a reason.

The pulp has its main duty to perform during the development of the dentine, no doubt, and after this is completed the function of the pulp is very much lessened; but to say it is of little importance is going too far. I would consider the pulp as a thing that is necessary to preserve the life of the tooth, as a safeguard against injury from without, and a protection against the attacks of caries. How else can we know when the carious process begins, unless there is pain to tell us? Such is the view of a theorist and microscopist.

Dr. Ingersoll. I am very glad Dr. Heitzmann has stated one objection the same as that offered by Dr. McCausey; that is, that nerve-fibrils cannot be seen in the tubuli.

Dr. Heitzmann. I did not say that. I said it cannot be proven that the dentinal fibers are nerves.

Dr. Ingersoll. I have always had the feeling that the specialist in any matter of science is in danger of overestimating the knowledge which he gains through the instrument he uses, whether it be the microscope, the telescope, or any other. I have no objection to giving due consideration and weight to the revelations of the microscope and the telescope through the work of specialists. I believe the hobby-riders are the greatest benefactors of the world. I believe the man who makes a specialty of a particular science gets out of it all there is in it, and is doing more for science than the man who generalizes or gives attention to many things. But I do

not want the man who has eyes to say to the blind man, "I question your sense of touch." I have the sense of touch, and another has eyes. He develops his sense of sight, and I cultivate my sense of touch; and he may have his sense of sight aided by the microscope, but I do not want him to deny to me the evidence of my other senses or of my mind's conception. The conclusion I arrive at by the deductions of reason is quite as likely to be correct as his arrived at by the sense of sight. With regard to a tooth, I find there is great sensitiveness in the periphery of the dentine; but a microscopist makes an examination with the microscope, and says, "I cannot see any nerves there." Need he therefore deny to me the evidence of my sense of touch? No. If microscopists say there are no nerves there, I think it is incumbent upon them to show what else there is beside nerve-tissue that has the conductive power of pain or the function of transmitting sensation.

Dr. Heitzmann. Living matter.

Dr. Ingersoll. I would like to know if the microscope gives us the ultimate distribution of nerves anywhere. I believe that nerves are broken up into millions and millions of fibers, and their ultimate distribution is very much in doubt. Is it strange that the ultimate distribution of the nerves of the teeth should also be a matter of doubt? With regard to the teachings of the books concerning nerve-tissue, we learn that the only persistent and essential part of a nerve is the axis cylinder, a gelatinous substance, and the fact that the connective tissue, which is supposed to constitute nerves chiefly, cannot be seen in the tubuli of the dentine is not sufficient, I think, to conclusively show that there is no nerve-tissue there. If the gelatinous fiber of the axis cylinder is drawn out indefinitely small,—too small to be observed with the microscope,—I do not know that that is any proof of their non-existence. I want it to be shown that there is some other tissue in the body that possesses the power of conductivity of sensation before I can believe that there is no nerve-tissue there. We do not know of any such now, that I am aware of. It is possible that that tissue—the nerve axis—performs both functions,—that of generating nerve-force and the conduction of impressions. My reason tells me that it is possible, because we do find throughout the body organs performing double functions. The absence of connective tissue in the tubuli might be anticipated. The office of connective tissue is mechanical,—to hold parts together; and there is no demand for this in the tubuli, for the tubuli themselves hold their contents together. The finer tubules do not admit of blood-corpuscles, but no man can say there is no blood circulating in them. Blood is red, or white, or black; it is blood all the same if it is a fluid carrying nutrient elements to the tissues. That is all



that is necessary in blood. We do not find blood-vessels in cartilage, but there is nutrition there. I do not see that it is necessary that blood-vessels should penetrate cartilage, and I do not see that it is necessary that the blood-corpuscles should penetrate the dentine. But we know that nutriment does enter the dentine.

Dr. Bogue. I do not understand that the microscopists on either side of the water have denied the presence of nerve-tissue in the dentinal tubules. They simply say it cannot be seen, or has not yet been seen, and is not proven to be there. I believe that those tubuli are occupied as Dr. Ingersoll thinks they are, but it has not yet been demonstrated.

Dr. Ingersoll. I have understood the objection to be made in that form, that there is no nerve-tissue there because it could not be seen. That is the objection as I have understood it. If it is conceded that there is nerve-tissue there, whether gelatinous or fibrous, then they concede the whole point so far as concerns my position.

Dr. Sudduth. I do not think there can be any strife in regard to that point. It is a mooted question as to whether nerve-tissue is found in the dentinal tubuli or not. But it is not necessary that nerve-tissue should be there in order that sensation may be transmitted. I have seen protoplasm transmit sensation. Take *amœba*, for instance, in which one has determined the presence of nerve-fibers, and a touch at one portion will cause the mass to draw away. The natural tendency of protoplasm is to conduct sensation.

I think this society is to be congratulated upon having a paper of this character presented before it. It is eminently practical, bearing upon your every-day work, and as far as the main results and ideas to be drawn from it are concerned I can heartily agree with the doctor. But when it comes to his interpretation of the histology of the pulp and its ganglionic character, and his conclusions in that direction, he is treading on ground that belongs to Dr. Heitzmann and myself. He is going into the special field of the microscopists, and we must stop him, as he does not claim to be a microscopist. The pulp has no characteristics at all in common with ganglionic structures. It has nerve-fibers, and we have traced those nerve-fibers to almost as fine terminations as the nerve-fibers in any other portion of the body, but our finest technique has never enabled us to see them pass beyond the odontoblastic layer. The doctor says that fibers may be so fine that we cannot trace them under the microscope; that is possible, but we have in connection with the microscope aids that go beyond our ordinary ocular powers of interpretation. The fiber, if present, would give some reaction to staining agents, and by that means we can trace it until it becomes very minute indeed, if it is continuous. Dr. Heitzmann will tell

you, as will every microscopist, that nerve-technique is the most difficult of all the techniques we have to use. The difficulties that are encountered by the general worker in this direction are sufficient excuse for the imperfect results we have attained, and of all places to demonstrate nerve-tissue there is none as difficult as the pulp itself, by reason of the hard tissue that surrounds and comes in contact with it.

I do not know when I have heard Dr. Heitzmann talk so that I could shake hands with him as cordially as I can to-night in regard to the histology of the pulp and the relations of the pulp-tissue to the dental tissues.

As regards the value of the pulp in dentistry, I think I can take an intermediate stand between Dr. Heitzmann as a scientist and Dr. Ingersoll as a dentist. My experience would not lead me to place the same value upon the dental pulp that Dr. Heitzmann does. After a tooth has reached its normal development, then to all intents and purposes, except it be for producing secondary dentine, which dentists in practice put very little stress upon, the pulp is no longer of any material value. When a pulp-canal is opened, a gateway to infection and subsequent pericementitis is opened; but except that one thing, and the danger of subsequent infection, which is very much lessened if not entirely nil by our present knowledge of antiseptic treatment, the pulp is of little or no benefit. It is the formative organ of the tooth, and I think Dr. Ingersoll deserves credit, as much as any other dentist in the country, for having started that idea ten years ago, and holding to it until the dental profession largely stands with him to-day. When a tooth is fully formed, the value of the pulp to the tooth is greatly lessened if not entirely destroyed. The natural result of our experimentation in connection with bridge-work has been to help to establish Dr. Ingersoll in his position on this question, because we have found that when a healthy pulp, in an antiseptic condition, is destroyed, there is no subsequent trouble. We have learned from such observation and clinical experience a fact which had escaped the observation of most of us.

There was another point, in regard to the reaction which Dr. Ingersoll mentions as coming from the inflammatory process,—pericementitis. Dr. Heitzmann brought up two points which he and I have striven over more than once, in regard to the life, or the lack of it, in the dentinal tissues, and their reaction, and in regard to the metamorphosis of tooth-structure. I think Dr. Ingersoll's clinical experience there is of great value. I do not think there is any reactive force, to amount to anything, to be even visible as a pathological condition, that we can demonstrate outside of the pulp-canal.

Irritation conveyed to the fibrils of the odontoblasts at their periphery is carried to the pulp-tissue itself. The natural function and office of the odontoblastic layer is to form dentine, and as a result of irritation secondary dentine is formed. Dr. Ingersoll does not claim to be a histologist, and if he had not stepped over into the special field of histology I should not have had anything to say regarding his views on the subject.

Dr. Atkinson. I will take occasion to say that I think if we would remember "the hole of the pit whence we were digged" and compare it with the luminosity of our present status, we would have less difficulty with each other's interpretation of what goes on in our minds. Dr. Ingersoll has grown some, and the profession has grown some; but Dr. Ingersoll in trying to give us better nominations does not seem to have succeeded. "Pulp" is poor; "ganglion" is worse. What is a ganglion? It is a knot. Our "knotted" structures indicate conditions previous to our emancipation. The amoeba, without differentiated organs, does all that the mammal does, by improvisation for the time being of digestory machinery through some sort of power that is not quite clearly understood. Many rhizopods and infusoria hunt their food, capture it, and solve it into pabulum, and it is converted into their bodies. Many of the infusoria improvise arrows from the ectosure or outer walls of their bodies, and dart these gluey portions like arrows, which paralyze the food they are in search of until they can overtake and seize it and put it through the digestory process.

What we are most interested in is to know how we best can avoid mischief and best restore organs, by whatever means we can invent or be informed of. There was a question in regard to what is the antecedent of a tooth. The papilla is the immediate agent in the formation of the tooth. It is, like every other germ, essentially a neural mass; not a differentiated mass of any kind, but holding the potentiality of all the tissues in it, and under favorable circumstances will produce them.

The point that I want to make is that if we could secure a sterilized condition of the neural masses that are called dentinal fibrils, occupying the dentinal tubules, we would have just as good a protection as it is possible to make. I have seen cases where chloride of zinc was used which converted the pulp-substance into hyperoxidized hydrate of carbon in one case, and in another into hydrozincate of albumin,—indestructible substances, and next to living pulp in preservative quality.

I am delighted to-night with the paper, with the spirit of the paper, and in general with the discussion. It is an evidence of our growth. There is much that is rather too deep for us to set



down as proved. The fact of the demand for a tissue that shall perform a certain duty lays the foundation so peculiar in protoplasm that we have to be very careful about denying the presence of what is called life. If we could get rid of that term life and get some other expression that would indicate what we mean, I think we would be able to agree better. That there is protoplasm in the dentinal fibrils and through the enamel we do know, and that under certain circumstances the enamel conducts sensibility we know. I have often said that I would never kill a pulp, never kill the baby for the sake of a funeral, nor kill the pulp for the sake of being able to extirpate it. I would preserve its life until it was dead by some other agency; I would cremate it, cure it. Teeth with their pulps destroyed, by whatever means, and remaining serviceable in the mouth, have been so often seen that we do not doubt it. I had a case in Sag Harbor where the alveolar plates were destroyed by necrotic process from the second molar on the right side below to the first molar on the left side, involving all the sockets; and the teeth were all saved and a new bony attachment or process has grown around them. Two were quite dark in color, their pulps having died, and yet these have good attachments as well as those that have the pulps alive. These are facts that we have seen. The interpretation of them is another matter. But I think that wherever we can get neuroplastic protoplasm and hold it in a pocket that shall represent the uterus, we can build tissues, and reproduce an organ that has blood supplied to it.

Dr. Ingersoll. I want to ask Dr. Heitzmann a question as to the character of some of the elements of the pulp. What kind of cells does he call those? [referring to drawing on blackboard.] Are they nerve-cells?

Dr. Heitzmann. No. Dr. Ingersoll seems to be ignorant of the fact that I strongly object to the word cell. The tissue building up the pulp is myxomatous tissue. At the points of intersection of the net-work there are thickenings; in the meshes there are protoplasmic bodies.

Dr. Ingersoll. Do you call those nerve-cells?

Dr. Heitzmann. No.

Dr. Ingersoll. Are they nerve-corpuscles?

Dr. Heitzmann. Not a bit of it. All that we see in the pulp are medullated and non-medullated nerve-fibers. When you call the protoplasmic bodies nerve-cells you are mistaken. When you speak of the pulp as being ganglionic in character you are mistaken again; and when you speak of it as a central organization you are mistaken for the third time. It is altogether a peripheral organization.

Dr. Ingersoll. Are the peripheral cells, or corpuscles, of the same character as those at the central part of the organ?

Dr. Heitzmann. No. Those are odontoblasts [referring to black-board diagram]. What do you gain by the addition of the word cell? The odontoblasts are forms characteristic of the pulp, situated at its periphery, but there is nothing of that kind in the interior of it. It is manifestly wrong to call the odontoblasts nerve-cells. They are the dentine-formers, and the dentinal fibrillæ—excuse me for using the term—are offshoots of the odontoblasts. The odontoblasts are not nerve-centers, and the dentinal fibrillæ are not nerves either,—at least nobody has been able to prove it.

Dr. Ingersoll. Can you tell me the difference between these internal cells and the odontoblasts?

Dr. Heitzmann. It is very great. The odontoblasts at the periphery are elongated bodies of an epitheloid character, whereas in the interior of the pulp we find lymphoid bodies lying in the meshes of the myxomatous tissue.

Dr. Ingersoll. I want to know if these cells are not nerve-corpuscles?

Dr. Heitzmann. Not a bit of it. They are dentine-formers; a very different class of bodies. I would like to ask Dr. Sudduth if his views are in accord with mine, so far as the structure of the pulp is concerned?

Dr. Sudduth. Entirely.

On motion of Dr. Perry, the thanks of the society were tendered to Dr. Ingersoll for his kindness in reading his very interesting and valuable paper.

Adjourned.

S. E. DAVENPORT, D.D.S., M.D.S.,  
*Editor New York Odontological Society.*

## FIRST DISTRICT DENTAL SOCIETY, STATE OF NEW YORK.

THE First District Dental Society of the State of New York held a regular monthly meeting Tuesday evening, May 14, 1889, in the New York Academy of Medicine, No. 12 West Thirty-first street.

The president, Dr. A. L. Northrop, in the chair.

Dr. V. H. Jackson, chairman of the Clinic Committee, read the following

### CLINIC REPORT.

A stated clinic of the society was held this afternoon at the depot of The S. S. White Dental Manufacturing Co., Broadway and Ninth street.

Dr. J. M. Edmunds, of New York, showed his "latest metallic capsule," which he hopes will fill the requirements of the root of a tooth. It is made of platinum about twenty-eight standard gauge, cylindrical in form, with oval openings cut from the sides. At the end of the cylinder is attached a countersunk porcelain crown, such as are being manufactured by The S. S. White Dental Manufacturing Co. The pins are cut short, and platinum plate is burnished to the surface and soldered with silver solder, attaching at the same time the crown to the cylinder. The portion forming the end of the cylinder is then covered with a thin layer of lead. With an antrum trephine corresponding in size to the cylinder, the alveolar process is cut into the required depth, leaving the core. The cylinder is then inserted and retained by flowing oxyphosphate between the crown and adjoining teeth. The doctor hopes by this method to secure a union through the oval openings in the cylinder between the core and the surrounding tissues. Dr. Edmunds also showed a removable bridge, sustained by bands burnished around the teeth used as supports, with the ends of the bands turned at right angles and thickened but not united; each end of the bridge having two dovetailed slots of such form as to receive the ends of the bands and draw them together as the bridge is pressed down, and thus clasp the teeth firmly. . . . Dr. A. H. Gilson, of Boston, forwarded to the committee, for the society, a variety of sand-paper disks and strips, which were distributed as samples. . . . Dr. Geo. A. Wilson, of New York, presented a regulating appliance for drawing bicuspid back to give room for cuspids crowded out of the arch. Piano wire made square, and surrounded with platinum to form a box through which it can slide, is vulcanized into a rubber plate which covers the roof of the mouth and the teeth not to be moved. The box extends back to the palatal end of the plate, where a nut is adjusted, which runs on a thread cut on the end of the wire. The opposite end of the wire forms a hook to pass around the tooth to be moved. By turning the nut the wire is drawn through the box and thus shortened. . . . Dr. E. D. Frost, of Elizabeth, N. J., presented a lady about thirty-two years of age, for whom he transplanted the first left superior bicuspid in April, 1888, which is now firm in its socket. The patient some ten years previously had a tooth taken from the same socket filled and reset, which had become badly absorbed. The socket was in a very unhealthy condition when the present tooth was set. . . . Dr. Geo. F. Reese, of Brooklyn, illustrated his method of treating and filling abscessed teeth, which he describes as supplying an "electric stimulus." He treats with carbolic acid and oil of cloves, fills the canals with cotton, and places in the pulp-chamber, in contact with the tooth, a small



wire of combination metal,—tin, silver, and gold; then fills the cavity about one-third full of oxyphosphate, covering the wire, and before it hardens presses in freshly prepared amalgam, forcing the cement towards the walls and thus lining the cavity. By this method he claims to get a better saving filling and an “electric stimulus” to the root of the tooth. . . . Dr. V. H. Jackson, of New York, showed two cases of corrected irregularities of the teeth, with models showing the condition of the mouth before regulating, and the appliances used. The first case, a girl aged nine years, with the superior arch too narrow. The superior lateral incisors and all the teeth on one side of the arch closed inside the lower ones. A split plate was used, covering the roof of the mouth only, and retained with a piano-wire spring passing from the plate over the arch and around a tooth on either side of the mouth. As the arch was spread, a spring attached to each half of the plate moved the lateral incisors forward to proper position. The plate was worn about five months. The second case, a boy of eight years, with the left superior lateral incisor closing inside the lower teeth. A gold band with a U-shaped piece of gold attached to the palatal surface was first cemented to the lateral. A piece of piano wire was formed to the curve of the arch and bent at the ends in the form of a letter S, the ends projecting into cavities in the anterior approximal surface of the temporary molars. The spring was tightened by bending the curved ends. The work was completed in twenty-five days, with no inconvenience or discomfort to the patient.

#### INCIDENTS OF OFFICE PRACTICE.

Dr. Reese. Mr. President, I have practiced the method of filling and treating pulpless teeth alluded to in the clinic report for the last three years or more, with good results in every case. My efforts have been directed towards finding a substance that would be the best substitute for the lost pulp, and I have found that a material composed of gold, silver, and tin in certain proportions seems to bring about a result that I would term vitality. When I have found it necessary to destroy a pulp, I prepare the cavity and insert at once a piece of this material against the tooth-tissue, sealing it up with oxyphosphate cement and then packing in the filling-material of gold or amalgam, and closing up the little tubules or canals. I shall be glad to send samples of this material to any of the gentlemen present who may wish to try it.

Dr. Walker. I have some of the points that Dr. Reese speaks of, and I would like to ask him how he prepares the points of this material for insertion in the root-canal so as to get it up to the apex.

Dr. Reese. It is not exactly necessary to bring it up to the apex.

If it is a molar tooth or a bicuspid, cut a piece of the metal and put it against the walls, and flow oxyphosphate cement over it; then pack your filling-material over that. That I have found to be sufficient. In some cases of treatment of upper front teeth it is a little difficult, and I wind a bit of cotton around an instrument, and into the end of the fuzzy cotton a little of the material, then put some disinfectant on that and pass it up to the cavity and retain it there some time, and it gives the same result. I have had lately a case where under the ordinary treatment a gentleman suffered with an abscessed tooth for twelve days, and I made him absolutely comfortable by the first treatment in that way. I had another case, a lower molar tooth which was abscessed three times, and which had been treated in Philadelphia by a well-known dentist. The gums were very much swollen and hardened, and the tooth was very sore. The patient came to me and I treated the tooth as I have described, and about two weeks ago I permanently filled it, with the same comfortable result. If you try this method and get the same satisfaction from it that I have, I should be pleased to have you acknowledge it.

Dr. E. Parmly Brown. Mr. President, I witnessed with a great deal of pleasure the clinics to-day, and although there were many disappointments, there was a great deal of value. I watched Dr. Reese's demonstration very carefully and I catechised him a good deal, and it seems to me that he has something very good. We have put gold fillings in roots for a good many years, and a large part of those fillings have remained and acted splendidly, and the metal may have had something to do with it. We have also filled roots with gutta-percha by the million, and most of them have behaved well. Dr. Reese has yet to prove that there is a scientific principle in his method, but we have no right to say that he has not struck something very nice.

The implantation case at the clinic seemed to be the best that I have ever seen in that line. In planting natural cone-shaped roots there is always the liability of absorption, and the cone-shape is constantly working against their remaining in position. Nature can hardly keep a tooth in under those circumstances, even though there may be a bony formation or ankylosis.

I told the Clinic Committee two months ago that I would show five patients at the clinic with porcelain bridges. I showed four. But one patient disappointed me. The day after the clinic that lady wrote me this letter: "I am more sorry than I can express for having failed to meet you at the clinic as I promised. I was sick in bed; but up to the last hour I hoped to be able to go. My teeth feel perfect. I should not know I had been made over except for

the comfort derived from it every day and hour." That is the way a patient feels after having four bridges put in the upper jaw, and after having the teeth in one month, all anchored to living teeth. A great deal of dental work we do is not expected to feel comfortable right away after it is done. She says, "Don't fail to let me know the next time, and I will be there if I can be of any service; nothing but sickness or death shall stand in the way." If she is not dead I will have her at the next clinic.

Under incidents of office practice I want to speak of something that Dr. Farrar was whispering in my ear. We were talking about uniting gold with amalgam, and he made the assertion that gold would not unite with amalgam. I have been picking out old gold and amalgam fillings for thirty years, and have failed to separate them in many instances. I have been patching defects in gold fillings with amalgam for years, and it is good practice. It often happens that we can patch with gold or amalgam when we do not want to take out the entire filling. I find that amalgam sticks to gold, making a homogeneous union.

Dr. Farrar. Dr. Brown does not state the thing just as I meant. The conversation arose from a case in which had been put a bridge-piece, having the shaft run in the approximal surface of a molar. I noticed that the shaft turned a little in a hole larger than the shaft itself. I suggested that, instead of packing gold around, to tighten the shaft, he put in amalgam. I also said that if he would varnish that gold with fir-balsam dissolved in chloroform, he would prevent the excess of mercury in the amalgam from injuring the texture or quality of the gold filling. He said there was no danger of that at all. I then said that in my experience I found, in a great many cases, where amalgam was placed in contact with gold fillings previously inserted, that after a few days they showed cracks between them. Such cracks were formerly regarded as evidence of shrinkage of the amalgam; but I found afterwards by experiment that such was not the case. A little of the surplus mercury acts upon the surface of the gold and dissolves it, so to speak, leaving it less in bulk. Amalgam acts more upon soft gold fillings than upon hard gold fillings. I find that varnishing gold fillings with fir-balsam dissolved in chloroform so insulates the gold that it prevents the mercury from affecting them. Fillings so treated I have never found to show cracks.

In regard to the union of amalgam with gold, it is true that it will unite, but it unites imperfectly; completely in some places, and in other places not so. In placing these two kinds of fillings in contact, we do not want to subject the teeth of our patients to the chance of such defects. If it can be done as Dr. Brown says, all



right, but in my practice it does not work that way. When fir-balsam varnish is used, such union of fillings works satisfactorily every time; and I will say here that I do not find the genuine article in shops, but obtain it from the fir-trees.

Dr. Bogue. Mr. President, Steurer's plastic gold will unite with amalgam after the fashion suggested by Dr. Kingsley, and further explained and improved upon by Dr. Clapp, of Boston, who showed me a union so strong that I was unable to break it with my fingers. Then I took a pair of pliers and could not break it. So I was obliged to confess that the union of gold and amalgam was really possible.

Dr. Evans. Mr. President, I indorse what Dr. Brown says in regard to amalgam and gold. If the surface of the gold is painted or rubbed over with mercury first, then when the amalgam is added there will be perfect union between the two fillings. I have used them in that way for twenty years, and have never seen any such separation as Dr. Farrar has spoken of.

Dr. Rhein. Mr. President, I have experimented some with this combination in the past few years, and I came to the conclusion that gold will unquestionably unite to amalgam. If you want to add gold to the amalgam, you can make a very safe and serviceable and perfect filling; but when it comes to the opposite procedure, the adding of amalgam to gold in any form or shape, whether the gold is of the densest variety or of soft character, it will invariably affect the gold, depending in degree upon the plasticity of the amalgam; and that is due to the affinity which mercury has for gold, which is greater than for the other metals with which it is in combination.

Adjourned.

B. C. NASH, D.D.S., *Secretary*.

#### DENTAL SOCIETY OF THE STATE OF NEW YORK.

THE annual meeting of the Dental Society of the State of New York was held at Albany, N. Y., on Wednesday and Thursday, May 8 and 9, 1889.

The following officers were elected for the ensuing year: J. Edward Line, president; W. W. Walker, vice-president; F. T. Van Woert, recording secretary; H. G. Mirick, treasurer; and G. L. Curtis, correspondent. The following constitute the Board of Censors: Wm. Carr, Wm. Jarvie, S. D. French, W. H. Colgrove, S. B. Palmer, A. M. Holmes, Frank French, and A. P. Southwick.

F. T. VAN WOERT, *Recording Secretary*,  
No. 152 Noble street, E. D., Brooklyn, N. Y.

## SOUTH CAROLINA STATE DENTAL ASSOCIATION.

THE South Carolina State Dental Association held its nineteenth annual meeting at Columbia, commencing Tuesday, May 14, 1889.

The following officers were elected for the ensuing year: R. Atmar Smith, president; J. Ryerson Smith, first vice-president; G. B. White, second vice-president; E. C. Ridgell, corresponding secretary; L. P. Dotterer, recording secretary; Geo. W. Dick, treasurer.

The following constitute the State Board of Dental Examiners: G. F. S. Wright, president; T. J. Calvert, J. R. Thompson, T. B. Legare, and L. P. Dotterer, secretary, Charleston.

The attendance was good, and the sessions animated. The next meeting was appointed to be held on the second Tuesday in May, 1890, at Charleston.

E. C. RIDGELL, *Cor. Sec.*,  
Batesburg, S. C.

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## GEORGIA STATE DENTAL SOCIETY.

THE twenty-first annual meeting of the Georgia State Dental Society was held at Tybee Island, June 11 to 14, 1889.

The attendance was the largest ever had in Georgia. The papers read and the discussions on all points were of a very high order.

The officers elected for the ensuing year were as follows: S. B. Barfield, president; R. B. Adair, first vice-president; W. G. Browne, second vice-president; C. A. Rider, recording secretary; L. D. Carpenter, corresponding secretary; H. A. Lowrance, treasurer. Examining Board: J. H. Coyle, A. G. Bouton, Wm. C. Wardlaw, G. W. McElhaney, and G. W. H. Whitaker, secretary. Executive Committee: N. A. Williams, H. S. Colding, W. W. Hill, S. B. Adair, and S. G. Holland.

The time for the next meeting was appointed for the second Wednesday in July, 1890, at Gainesville, Ga.

L. D. CARPENTER, *Cor. Sec.*,  
Atlanta, Ga.

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## MINNEAPOLIS DENTAL SOCIETY.

THE Minneapolis Dental Society held its annual meeting at Minneapolis, Minn., on Wednesday, May 15, 1889.

The following officers were elected for the ensuing year: E. F. Clark, president; J. A. Parker, vice-president; E. J. Morrison, secretary; C. M. Colby, treasurer, and T. E. Weeks, librarian.

E. F. CLARK, *Secretary*.

**AMERICAN DENTAL ASSOCIATION.**

THE twenty-ninth annual meeting of the American Dental Association will be held at Saratoga Springs, N. Y., commencing at ten o'clock A.M., on Tuesday, August 6, 1889.

GEO. H. CUSHING, *Recording Secretary*,  
No. 96 State street, Chicago, Ill.

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**NATIONAL ASSOCIATION OF DENTAL EXAMINERS.**

THE next meeting of the National Association of Dental Examiners will be held in Saratoga, N. Y., Tuesday, August 6, at 9.30 A.M., and at other times during the week, between the sessions of the American Dental Association. It is important to have every State Board represented.

FRED. A. LEVY, D.D.S., *Secretary*,  
Orange, N. J.

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**NEW JERSEY STATE DENTAL SOCIETY.**

THE nineteenth annual meeting of the New Jersey State Dental Society will be held at the West End Hotel, Asbury Park, commencing Wednesday, July 17, 1889, the sessions to continue three days.

Prominent dentists from throughout the country will read interesting papers, and the clinics will be more than usually instructive. Everything new and useful in operative and mechanical dentistry will be exhibited by the inventors and dental supply houses, for whom spaces will be reserved. Low hotel rates will prevail.

CHARLES A. MEEKER, D.D.S., *Secretary*,  
Newark, N. J.

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**MINNESOTA STATE DENTAL ASSOCIATION.**

THE sixth annual meeting of the Minnesota State Dental Association will be held in Duluth, on July 10, 11, and 12, 1889. Members of the profession are cordially invited to attend.

L. D. LEONARD, *Chairman Ex. Com.*,  
Minneapolis, Minn.

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**WISCONSIN STATE DENTAL SOCIETY.**

THE nineteenth annual meeting of the Wisconsin State Dental Society will be held in Milwaukee, convening on Tuesday, July 16, 1889, the sessions to continue for three days. An interesting programme is being arranged.

CLAUDE A. SOUTHWELL, D.D.S., *Secretary*,  
411 National avenue, Milwaukee, Wis.



## PENNSYLVANIA STATE DENTAL SOCIETY AND EXAMINING BOARD.

THE twenty-first annual meeting of the Pennsylvania State Dental Society will be held at Cresson Springs, Cresson, Pa., beginning on Tuesday, July 30, 1889, the sessions to continue for three days.

P. K. FILBERT, *Cor. Secretary*,  
Pottsville, Pa.

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The Pennsylvania State Dental Examining Board will meet at Cresson, Pa., on Tuesday, July 30, 1889. Persons who intend to come before the board for examination are requested to notify either the president or secretary.

W. E. MAGILL, *President*, Erie, Pa.  
J. C. GREEN, *Secretary*, West Chester, Pa.

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## A CORRECTION.

TO THE EDITOR OF THE DENTAL COSMOS:

In the report of a meeting of the Philadelphia County Dental Society, as printed in the DENTAL COSMOS for May, the types place me in a rather curious position. I am reported as devitalizing dental pulps with sulphate of atropia and using amalgam as a retaining-plug.

The actual facts were these: The essayist having alluded to a trial of cosmoline, as a vehicle for arsenious acid, I stated that I had used it for about eighteen months, but abandoned it because it seemed to retard the action of the agent. At the suggestion of Dr. L. Greenbaum I had substituted sulphate of atropia for the usual morphia, and had devitalized over forty pulps painlessly. There then occurred several consecutive cases of pain, and I had reluctantly abandoned the atropia for a time. After a while it occurred to me that perhaps the preparation had deteriorated on account of age, and I recommenced its use with considerable success. The formula was:

Arsenious acid, 2 grains;  
Sulphate of atropia, 1 grain;  
Lanolin, 10 grains.

It was used only in a very minute quantity, and thoroughly protected.

The essayist having expressed his surprise at the few accidents which the gentlemen present seemed to have, I replied that probably it arose from the caution taught by the first case of trouble. My only case occurred when I was a student, and it had been quite enough. Since then I had handled arsenious acid with extreme

care, and in all risky places—that is, where there was a cavity close to the gum or inaccessible—I had sealed it in with amalgam, using for this purpose Flagg's "Facing," which was a non-shrinking amalgam and easily removed.

I do not wish to go on record as using atropia to *devitalize*, or amalgam as a general means of sealing in arsenious acid, and therefore ask that you kindly insert this correction.

A. B. HARROWER.

## DENTAL COLLEGE COMMENCEMENTS.

### LOUISVILLE COLLEGE OF DENTISTRY.

THE third annual commencement of the Dental Department of the Central University of Kentucky (Louisville College of Dentistry) took place at Macauley's Theater, Louisville, Ky., on Tuesday evening, June 18, 1889.

The valedictory address was delivered by George Etly Wetherton, D.D.S., of Mississippi.

The degree of D.D.S. was conferred on the following graduates by Rev. L. H. Blanton, D.D., chancellor of the university:

NAME.	STATE.	NAME.	STATE.
S. T. Butler .....	Kentucky.	Frank T. Richards.....	Wisconsin.
Thomas W. Harris. ....	North Carolina.	Charles R. Shacklette....	Kentucky.
Valentine A. Hobson....	Kentucky.	Francis R. Steirly... ..	Minnesota.
Peter Hendricks.....	California.	Frank E. Taft.....	New York.
Ireneus D. Hitchcock....	Indian Ter.	T. D. Von Beust.....	Indiana.
N. B. Jenkins.....	Kentucky.	Albert B. Weaver, Jr....	Kentucky.
Charles Gray MacGill....	Maryland.	Geo. Etly Wetherton....	Mississippi.
Archag. Melcon.....	Turkey.		

### BOSTON DENTAL COLLEGE.

THE twenty-second annual commencement of the Boston Dental College was held in Paine Memorial Hall, Boston, Mass., on Wednesday, June 19, 1889, at 7.30 P.M.

The annual address was delivered by Rev. Edward H. Hall, D.D., and the valedictory address delivered by Henry H. Piper, D.D.S.

The number of matriculates for the session was 71.

The degree of D.D.S. was conferred on the following graduates by I. J. Wetherbee, D.D.S., president of the college:

George Andrew Bates,	Walter Sumner Kenyon,
Lewis Sherman Breed,	Forrest Holden Lynde,
Leonard Erving Brewster,	Joseph Delaney Maher,
Marcus Fordyce Brooks,	George Henry Payne,
Melville Bryant Buckley,	Henry Hildreth Piper,
Joseph Martin Bulger,	Harry Rogers Roberts,
Harry Hawkins Colony,	Fred Le-lie Sprague,
Melvin Everett Davenport,	Frank Eugene Stedman,
Irving Prescott Eddy,	Leon Clarence Tolman,
George Herbert Gillander,	George Archer White,
John Benedict Gillon,	George Thomas Phillips.
William Preston Houston,	

## EDITORIAL.

### THE JOHNSTOWN CALAMITY.

THE circular which follows should appeal to the generous impulses of every member of the dental profession. The noble response to the general call for immediate relief for this sorely afflicted region does not and should not preclude a united and generous effort on the part of dentists throughout the country to aid their brethren whose means of subsistence have been taken from them. We earnestly bespeak subscriptions for this special fund, and hope to chronicle a response which will be an honor to the profession.

PITTSBURGH, June, 1889.

*To the Dental Profession and Manufacturers and Dealers in Dental Goods :*

A terrible calamity has swept a once populous and prosperous city almost out of existence. Johnstown, Cambria Co., Pa., which, with its suburbs, contained about 25,000 inhabitants, is in ruins, thousands of lives lost, and millions of dollars' worth of property destroyed. In this ruin our professional brethren have had their share. Johnstown contained ten practicing dentists; one lost his life, others lost parts of their families, most of them lost all their property, and all have lost their practice, at least for a long time to come.

The members of the profession in this vicinity, while recognizing the fact that nearly all have already contributed to the general relief fund, yet think that as a simple act of justice the profession at large should step in to the relief of our professional brethren in distress, not as an act of charity, as that word is generally used, but in a higher sense, as brother to brother.

The undersigned have been appointed a committee to present the matter to the profession and dental trade, and to receive subscriptions for the purpose named. We think the cause needs no urging on our part, believing that each and every one will be glad of the opportunity to cast in his mite.

We need hardly add that our action is taken without the knowledge of the sufferers at Johnstown. Subscriptions may be sent to our Treasurer, and drafts, orders, etc., made payable to his order.

W. F. FUNDENBURG,  
J. G. TEMPLETON,  
H. W. ARTHUR,

J. S. GOSHORN,  
LEE S. SMITH, *Treasurer*,  
52 Sixth st., Pittsburg, Pa.

### THE ANNUAL MEETINGS.

THE American Dental Association will hold its next annual meeting at Saratoga Springs, N. Y., commencing on the first Tuesday (6th) of August next.

The Southern Dental Association meets at Galveston, Texas, the first session occurring on Tuesday, the 20th of August.

These are important meetings, and there is promise of a large attendance at each of them. We published in our May issue full particulars of the Southern meeting, but up to the time of going to



press with this issue had not received the programme of the American Association, although a short notice of the meeting will be found under the regular heading of society proceedings.

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### THE ODONTOLOGICAL SOCIETY OF VICTORIA.

THE present officers of this antipodal society are: President, J. Iliffe, Esq.; Vice-President, A. M. Townsend, Esq.; Hon. Treasurer, F. A. Down, Esq. Committee, D. McGregor, Esq.; P. McIntyre, Esq., and G. Thompson, Esq., L.D.S.

Organized in 1884 for the promotion of dental science and the maintenance of the honor and interests of the dental profession, its requirement for membership is as follows:

"Any dentist shall be eligible for election, provided that he be of good character; that he does not conduct his practice by means of the exhibition of dental specimens, appliances, or apparatus, in an open shop, or in a window, or in a show-case exposed to public inspection; or by means of public advertisements or circulars describing modes of practice, or patented or secret processes; or by the publication of his scale of professional charges."

The dentists of the latest continent appear desirous of keeping rank with their fellows along the whole line of the foremost men in the dental profession.

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### CARE OF THE TEETH FROM A MEDICAL STAND-POINT.

In the Periscopic department of the current number will be found a paper by Dr. Samuel Sexton, read before the Practitioners' Society of New York, the discussion which followed, and a *Record* editorial thereon, all of which we lay before our readers without further comment than the remark that they will for various reasons repay perusal.

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### AN EXPLANATION.

EXPLANATIONS are always in order, and when necessary to correct errors are as honorable on the one side as they are welcome on the other. This observation applies to the following note as well as to several due, but not yet received.

NEW YORK, June 11, 1889.

DR. J. W. WHITE, President S. S. White Dental Manufacturing Co.:

DEAR SIR,—I have just been informed by Dr. Perry that the patent on his separators was not procured until 1887.

In that case my inferences from remarks made by him at the April meeting of the New York Odontological Society were not correct, and I regret having given expression to an error.

Yours truly,

E. A. BOGUE.

## BIBLIOGRAPHICAL.

INTERNATIONAL POCKET MEDICAL FORMULARY: With an appendix containing Posological Table, Formulæ for Inhalations, etc. By C. SUMNER WITHERSTINE, M.S., M.D., associate editor "Annual of the Universal Medical Sciences;" late house-surgeon of the Charity Hospital, New York; visiting physician, Home for the Aged, Germantown, Pa. Philadelphia and London: F. A. Davis, publisher, 1888. Bound with pocket and tuck. Price, \$2.00.

This is a convenient index of diseases and remedies, the diseases being alphabetically arranged and reference thereto made easy by a marginal cut-in index. The formulæ, following under the various diseases enumerated, are from the most prominent practitioners in the several departments of medical practice at home and abroad, and embrace the recent additions to materia medica, including many of the old-time standard prescriptions. A special value in such a compilation is to be found not alone in the systematic arrangement of remedies under the various pathological conditions for which they are employed, but in the information thus conveyed as to remedies and combinations, especially of the numerous and valuable additions to materia medica which have been only a short time before the profession.

The book is interleaved for convenient addition of approved remedies under the same classification as those published.

TRANSACTIONS OF THE COLLEGE OF PHYSICIANS OF PHILADELPHIA. Third Series. Volume the Tenth. Cloth, octavo, pp. lxxvi, 456. Philadelphia: Printed for the College, 1888. For sale by P. Blakiston, Son & Co.

This annual visitant comes to us in its usual neat garb of good paper, large and clear type, and with evidences of careful press-work. After the regular lists of officers, fellows, etc., biographical sketches are given of Drs. Caspar Morris and Nathaniel Archer Randolph, followed by two annual addresses of the president, Dr. S. Weir Mitchell. The regular papers (twenty-six in number) read before the college from July, 1887, to December, 1888, are then given, with the discussions following each. Several of the papers are illustrated and elucidated with wood-cuts, plates, charts, etc.

## PAMPHLETS RECEIVED.

Finger Training in Dentistry: An address delivered at the annual meeting of the Midland Branch of the British Dental Association, held in Liverpool, May 17, 1889. By the president, Henry Clay Quimby, L.D.S.I. Liverpool: Gilbert & Walmsley, 1889.

## OBITUARY.

F. H. REHWINKEL, M.D., D.D.S.

DIED, at Chillicothe, Ohio, June 8, 1889, of paralysis, F. H. REHWINKEL, M.D., D.D.S., in the sixty-fourth year of his age.

Dr. Rehwinkel was born at Celle, Hanover, Germany, June 15, 1825, and in that city began his medical education, which was afterwards completed at a German university. He came to this country in 1849, commenced medical practice at Natchez, Tenn., and subsequently was associated with Dr. J. H. Pulte, in Cincinnati, Ohio. In 1850 he removed to Chillicothe, and was married on the 25th of November in that year. He opened an office in Portsmouth, Ohio, but a year afterwards returned to Chillicothe, and about the year 1853 turned his attention to dentistry, and graduated from the Baltimore College of Dental Surgery in the year 1854, since which time he has practiced dentistry uninterruptedly with the exception of the years 1861 and 1862, during which he was with the Union army. After a period of severe service he went home on sick leave, and on his way to rejoin his regiment met with an accident which necessitated nearly a year's use of crutches and compelled him to leave the service. About one year ago, while hurrying to catch a train he was overcome with the heat, and has since been in precarious health, although his physicians did not anticipate the sudden and fatal shock. His wife and a daughter survive him.

The funeral obsequies of Dr. Rehwinkel brought to Chillicothe a large company of distinguished men, including the governor of the State. The ceremonies are said to have been the most impressive and imposing ever witnessed in that city, which fact sufficiently attests the high regard in which he was held. His professional associates and friends will no less publicly and warmly manifest their respect and affection in letters and resolutions of commendation and condolence.

Dr. Rehwinkel's connection with and activity in State and National dental and medical associations are very well known. He has been president of the Ohio State Dental Society, Mississippi Valley Dental Association, and the American Dental Association; secretary of the Dental Section of the Ninth International Medical Congress; chairman of the section of Oral and Dental Surgery of the American Medical Association, etc. His contributions to dental literature have been considerable, and an intimate acquaintance with European dentists of eminence enabled him to introduce them and their works to the profession in America. He was always modestly prominent in the meetings of every dental society which he could by any means attend, and his demeanor under all circumstances was such



as to win and hold the confidence and affection of his professional brethren. His skill in practice was of a high order, and his character was that of the honored and honorable citizen, patriot, practitioner, friend, husband, and father who can be eulogized without hesitation or mental reservation. No man in the dental profession of America was more universally trusted and beloved than he, and the death of no one could be more sincerely lamented.

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#### PROFESSOR EDMOND ANDRIEU.

DIED, in Paris, France, May 14, 1889, Professor EDMOND ANDRIEU, in the fifty-sixth year of his age.

Dr. Andrieu was probably the most prominent writer in recent French dental literature. His works are numerous, and he bore many actual and honorary titles. He was an M.D. of the Medical Faculty of Paris, surgeon dentist of the Paris hospitals, president of L'Institut Odontotechnique de France, honorary president of the Société Odontologique de Paris, clinical professor of the Dental School of France, etc. Among his most voluminous productions in dental literature are his translation into French of the Austen edition of "Harris's Principles and Practice of Dentistry," and his recent-large illustrated "Treatise on Operative Dentistry." His decease will be generally regretted, and cuts short a career of usefulness to his countrymen and to the dental profession.

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#### DR. LEON RIDEOUT.

At the semi-annual meeting of the Massachusetts Dental Society, held in Boston, June 5 to 7, 1889, a committee, consisting of Drs. S. G. Stevens, A. W. Howland, and S. F. Ham, reported resolutions of respect to the memory of Dr. Leon Rideout, of Lynn. The resolutions (received from Dr. E. O. Kinsman, secretary) were adopted unanimously, and deplored the society's loss of "one of its most valued members; a man of excellent judgment and skill in his profession; interested in every movement tending toward its advancement; one who was highly esteemed in the community in which he lived, and eminently successful in his calling. Genial in disposition, beloved by all who knew him, his presence will be missed from among us."

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#### DR. FLAVIUS SEARLE.

At the meeting of the Massachusetts Dental Society held in Boston, June 5 to 7, 1889, resolutions of respect were passed upon the death of Dr. Flavius Searle, of Springfield. The resolutions were

submitted by a committee consisting of Drs. L. D. Shepard, R. R. Andrews, and G. A. Maxfield, and recited that the society had "lost an old and valued member, whose influence was always exerted to elevate the profession and increase its usefulness;" that the society "recognizes the great value of his services to the community in which he lived for so many years, and his generous contributions to the theory and practice of the art of dentistry in thoughtful study and investigation."

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## PERISCOPE.

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THE CARE OF THE TEETH FROM A MEDICAL STAND-POINT.—I shall confine my remarks to quite a limited consideration of dentition, caries of the teeth, and some of the neuroses resulting therefrom.

Though this subject has an extensive and valuable literature of its own, particularly in respect to the anatomy and pathology of the teeth, yet a wide field remains, in a medical point of view, for further observation and research, especially in respect to the treatment of affections influenced by dental irritation coming under the physician's care.

Were rational methods of research—such as have characterized the exact study of diseases of that group of special sense-organs comprising the ear, nose, and eye, and contributing so greatly to the success of specialism—brought to bear throughout the field of oral surgery, the marked indifference of physicians toward this specialty would soon cease to exist. There is every reason a more general knowledge of the teeth should prevail among medical men, when the well-known sympathy between them and their highly specialized neighbors is considered, since neither one of these organs, including the teeth themselves, can be long affected without disturbing the equilibrium of the nervous distribution about the head. It is well known that these different organs, when diseased, have a more or less retroactive influence on each other; the moment one of them is ailing, its morbid influences are propagated to the rest, though not necessarily affecting them all in the same degree. The most superficial knowledge, indeed, of the *modus operandi* of the complex nervous net-work involved, shows how puzzling under treatment for many of the diseases to which they are subject the behavior of the ear, nose, and eye at times must be, without taking into consideration the influence of diseased teeth. Of course in health these highly organized neighbors maintain an independent and separate existence, so to speak, their intimate sympathetic relationship scarcely manifesting itself perceptibly. Under certain conditions of the system, however, these organs become strikingly susceptible to disturbing influences, and so far as my own experience goes, from no cause more frequently than dental irritation.

There are certain periods in life when dental disturbances are most marked, and at such times the trouble is emphasized in run-down subjects; these periods are the first dentition of infancy, the completion of the second dentition at puberty, and the eruption of

the wisdom-teeth. During the first three years of childhood, while the first twenty teeth, comprising the first set, are coming, more or less irritation from soreness of the gums is generally experienced, and often the suffering from pain and sympathetic disturbance is very great.

Dentition is spoken of as a physiological process, but nature very often dispenses rather torment than pleasure during the active stages of dental evolution. The clumsy work of the blunt tooth-crown, slowly and painfully crowding its way through the tough gum-tissue, is a severe draft on the infant's store of nervous energy, and in many cases it can but be a source of wonder that they survive the struggle. From the irritability due to loss of sleep, headache, gastric disturbance, etc., many infants are kept in a run-down state all the time, and are, therefore, exceedingly susceptible to head catarrhs, and consequent aural, nasal, and ophthalmic complications, whose management is the more difficult, inasmuch as this causative influence, often the principal one, uninterruptedly continues.

One is surprised at the reluctance so often manifested in acknowledging the vast importance of dentition as a factor in infantile disorders, since instances are by no means infrequent where the trauma, due to the contusion of every tooth coming through the gums, is accompanied by convulsions or an exacerbation of the ear, nose, or eye trouble to which the process may happen to be particularly obnoxious. Fortunately, however, the cruel punishment meted out along with the first instalment of dental fixtures is followed by a period of comparative rest and recuperation from the exhaustive labor of dentition, lasting until about the sixth year.

During the interregnum between first and second dentition, or at any time after they are cut, the first teeth may decay prematurely as a result of malnutrition; or tartar may form on them. If catarrh of the gums now occurs, with suppuration of the socket and periostitis of the alveolar processes, besides the distressing oral irritation ensuing, some of the teeth may be lost.

Second dentition, often beginning at the end of the fifth year, but usually during the sixth year, is delayed a year or two in some feeble children backward in their development, though, before coming through, the site of the two lower six-year molars may long be seen beneath the gum, as indicated by a well-marked prominence.

Children may not suffer pain from the permanent teeth while pushing their way underneath the temporary set, though they frequently become very nervous indeed. Deciduous teeth now have their nutrition cut off, become gradually loosened by absorption, and are pushed out of the way as so much rubbish. In children having narrow jaws, the teeth, coming in rapidly, are liable to be crowded out of place. In ill-nourished children early decay of the teeth is to be feared. Where such mishaps take place, and fragments of shedding teeth remain attached to the gums, an appalling amount of irritation is set up in the mouth. Second dentition is often a severe ordeal, as may be surmised, and if children are badly fed and clad, and overworked mentally or physically, they are liable to give way under the strain. The exanthemata are ill borne during difficult dentition, and the teeth afterward give evidence of malnutrition, the arrest of development leaving various tracings



upon them. The shape and strength of the teeth are often thus modified by constitutional influences during their growth. A number of these defects are known to occur with considerable uniformity, and have received appropriate names indicating their anatomical appearance. The writer has, however, looked in vain for characteristically marked teeth which might be traced to any particular disease, such as have been described by Hutchinson for example, as due to syphilis. While children subjected to the cramming process of our public schools have execrably bad teeth, it is alleged that among deaf children and others of slow mental development the contrary holds good.

The cutting of the four second molar teeth takes place about the twelfth year, and concludes the second dentition, excepting the wisdom-teeth, which, on account of its importance, I have here regarded as a third process.

Until all of them are entirely through the gums the teeth of children should be kept under observation, since many nervous affections are due to the physiological disturbances they give rise to, and being unattended by pain are liable to be overlooked.

The *dens sapientia*, or third molar teeth, due about the seventeenth year, are often several years behind their time. In the lower jaw they are in erupting prone to take a header, so to speak, and land against the second molar, already firmly implanted in its place. The futile effort, after a false start, to crowd into line with the other teeth is sometimes attended with agonizing pains, and is not always successful.

Sometimes the irritation goes on for years, until nature seems to exhaust her expulsive forces without completing the process of eruption; pains may or may not be experienced; sometimes they seem to shoot from the tooth to the ear. Through nervous sympathy the ears are very often affected. The two upper wisdom-teeth usually erupt a short interval after the two lower, and are cut with less difficulty; they often keep well out of view, presenting themselves to the buccal cavity.

Since these molars seldom occupy their normal place in the jaws they are comparatively useless, and it is generally believed that their extraction is no loss. But whether the pains of eruption are great or absent altogether, the ear, nose, and tonsils often suffer very much from the long-continued irritation through nervous sympathy. Sometimes a flap of the gum remains over the second and third molar teeth for a considerable time after they are cut, indeed until they assume their proper position on a level with the other teeth. This flap of hard tissue remains attached to the gum posteriorly, and is kept in an irritable condition by the mastication of food.

Caries of the teeth, owing to their insensibility and density, is a slow and insidious process, unless the teeth are abnormally soft. The patient may not be aware of any disease until either the central pulp or periosteal covering becomes inflamed and sensitive to thermic changes, produced by hot or cold fluids and the like. Susceptible persons, as is known, often experience excruciating pain, since both the pulp and periosteum are well supplied with sensitive nerves. If caries progresses too far before the diseased portion is removed and the cavity stopped, sooner or later the inflammatory process extends

itself from the pulp-chamber downward through the fangs into the cellular tissue underneath, where an abscess is liable to form. The purulent matter may, whether partially encysted or not, escape either through the hollow crown or find an outlet alongside the root. The former, however, is often prevented by the minuteness of the canal of the fang, or by the closing up of the crown cavity with food or by a filling. An abscess at the apical outlet of the fang may remain for a long time, the purulent matter finding an outlet into the mouth in the manner above described, causing foul breath, and sometimes a very disagreeable taste.

Drainage through the gum is probably facilitated when the tooth has been partially denuded by detachment of the periosteum. Some of the products of inflammation are probably taken up into the system directly from the abscess by absorption. So long as matter escapes one way or the other, the patient may experience but little pain or other inconvenience. Should the drainage be arrested from any cause, for example, as from taking cold after the crown has been stopped, or filled with impacted food, pain and swelling of the jaw take place. Everyone is familiar with the comically swollen face so often seen in connection with a "gumboil," as the abscess accompanying the exacerbation is popularly called. It is a misnomer to designate these teeth as absolutely "dead" so long as any nutrition is derived from the periosteum of the alveolus, though the perhaps equally important source of vitality, namely, the pulp, may be wholly wanting. The ultimate career of carious teeth, where the pulp is absent, depends largely upon the state of the periosteal envelope; this, being very tenacious of vitality, may aid in retaining the tooth a long time. In many instances, however, the painfulness of exacerbations, after a tooth has been stopped, is unendurable, and the offender is extracted. In some vigorous persons a "dead" tooth may remain in the jaws, even after being filled, without perceptible irritation for a long time. But in most persons, especially those who have become run down, there is more or less nervous irritation, often without any perceptible disturbance in the tooth itself, which, together with the effects produced by a deep abscess in the gums, very decidedly affects the health in one way or another. Moreover, as the death of the tooth becomes more complete its position in the jaw is similar to the sequestræ of bone,—it is more or less of a foreign body. On the removal of pulpless teeth, which have been filled for some time, a surprising quantity of fetid matter and highly offensive gas often escapes from the pus-cavity.

Destructive inflammation sometimes is set up in the pulp of a tooth by the concussion of a fall or a blow, the tooth afterward becoming more or less dark in color, as in instances where the loss of the pulp occurs in consequence of caries.

Carious teeth are not only often sensitive to thermic changes, as has been stated, but they may be tender to the impact of mastication or other force applied to them. When metal fillings are not well borne in the cavities of sensitive teeth, because of their readiness to transmit impressions of hot and cold, the pulp often becomes so painful that dentists destroy it entirely, afterward filling the pulp-chamber and canals of the fangs with substances more or less indestructible. In

this procedure the cavity of the tooth is made as free of carious tissues as possible before it is filled.

These teeth are tolerated in the jaws, after they have been stopped up, for a longer or shorter time. They are usually sensitive in some degree, as morbid action scarcely ever ceases entirely. Suppuration occurs in a very considerable number of instances, and pain is experienced in consequence of the pressure of retained secretions. Relief usually follows removal of the filling; if this is delayed a gumboil is established with an outlet on either the buccal or palatal surface of the gum, but most frequently in the former situation. The minute opening of these sinuses, to the inexperienced, is often difficult to find, and hence the existence of a suppurating cavity, consequent on a gumboil, is not always suspected, but may exist for years without discovery unless the outlet becomes obstructed. The roots of the teeth underneath the antrum of Highmore impinge closely upon this cavity of the upper jaw, and alveolar abscesses sometimes find an outlet into it; the purulent matter finally escaping through the nose.

The question of retaining these so-called dead teeth in the jaws is one to which I have been obliged to give much attention, since a very considerable number of persons coming to me with aural affections have nervous troubles associated therewith which cannot be successfully treated until the affected teeth are removed. I have found that the irritation propagated from diseased teeth, especially those filled after destruction of the pulp, has very often delayed or even prevented recovery. After the removal of such teeth recovery is often very rapid. Much has been said about the harmlessness of keeping diseased teeth in the jaws, but we must remember that the practice is never a safe one, since it ignores the very first principle of surgery, namely, the maintenance of drainage. Moreover, it is not possible to thoroughly clean out the canal cavity of most carious teeth, and even if this were accomplished, it would not prevent further necrotic action going on in the pulp-chamber, canal of the roots, or at the apical outlet under favoring circumstances, since the main source of nutrition is cut off from these parts. The filling-material is sometimes pushed through the canal of the root into the tissues beyond. A case of this kind once came to me where the gold used in filling had thus kept up an irritation for more than ten years, which, though not appreciable locally, caused neuralgic pains in the head. Entire relief followed removal of the tooth. It would seem that such accidents as the above could not always be avoided, since the dentist must carry on his work in a region beyond the range of vision, and in structures whose size and condition are subject to great variation. Though strong and healthy persons may tolerate the presence of these teeth under exceptionally favorable circumstances, it is generally a safe rule to always remove them from the jaws of delicate persons.

In this connection it is well to point out the possible, nay often probable, danger to health from all fixtures now so commonly worn in the mouth, requiring for their retention the remains of defective teeth, as caps, crowns, bridges, and other metal attachments. Pivot teeth and transplanted or replanted teeth are likewise more or less detrimental, as are also ill-fitting and vulcanite plates.



Tartar cannot be regarded as a disease of the teeth, since its accumulation at any age is due, for the most part, to an excess of alkaline salts in the saliva. Its presence may afford a valuable indication in the treatment of subjects of a gouty diathesis.

In facial palsy, torticollis, chorea, and the like, the influence of diseased teeth and dentition should never be overlooked.

In the treatment of alveolar abscess by removal of the teeth, time should not be lost in waiting for swelling to subside before extraction; nor should pieces of roots or the alveolar process be left to work out themselves.

We all of us, I presume, are reluctant to criticise the well-meant endeavors of others, and in considering the ill-advised and injurious dental work done, sight should not be lost of the commendable advances made in dentistry during the past fifty years. And whatever may be said in respect to the meddlesome treatment of the teeth, especially carious teeth, now so much in vogue, it is largely due to the indifference of the profession toward oral surgery. It is true that medical men have taken up the study of the teeth from time to time, and have by their labors very much advanced dental anatomy and pathology; but it is not to the acquisition of medical knowledge that dentistry is indebted for the development of clever handiwork, but to the special smithcraft of recruits coming from the ranks of metal-workers and other skilled mechanic arts.

So long as dentists are wanting in surgical knowledge, unattainable without due course of study, and surgeons taking up this profession are unable to acquire the practical mechanical skill requisite in dentistry, the status of dentists must needs remain undecided, for its recruits come from these extremes.

It would seem that the sooner a greater knowledge of oral surgery than generally prevails is made a requisite for graduation by medical schools, the better it will be for all concerned. But this cannot be accomplished by the establishment of dental colleges alone, for oral surgery differs from no other specialty in respect to requiring a regular medical training. Unfortunately, however, for the inauguration of any measures of reform in this direction, the apathy so long existing in the profession as regards the subject has practically excluded this branch of surgery from the domain of medicine, greatly to the disadvantage of those who are called upon to treat neuroses arising from diseases of the teeth. If medical colleges undertake to educate dentists, it would be well to bear in mind the necessity for thoroughly equipped laboratories in which metal-working may be taught.—*Samuel Sexton, M.D., before the Practitioners' Society of New York, in Medical Record.*

*Discussion.*—Dr. Beverley Robinson said that earache, or even a discharge from the nose, was not infrequently due to some trouble with the teeth, but it was more common to find neuroses in the pharyngeal region from this cause. He believed that amalgam fillings were especially injurious, and it was his custom in cases of this kind, when the ordinary remedies failed, to send his patient to the dentist in order to have any amalgam fillings that might be present removed. He saw a patient recently who had been under his care some time ago. This man had suffered greatly from pain

in the pharynx, especially at night, and no relief had been obtained by any of the remedies employed, such as sprays and local applications, or even from anodynes given in doses as large as was consistent with safety. There was no local trouble apparent. Finally, some amalgam fillings in his teeth were removed, and then his troubles ceased.

Some time ago he had attended a lady suffering from a very severe attack of mumps. After the disease had subsided there was considerable swelling left around the angle of the jaw. A needle introduced into the swelling gave no evidence of the presence of pus. As the swelling persisted, massage was finally employed, and this was followed by a discharge of pus into the mouth. On the second day after the massage was begun the lady complained of a feeling of "goneness" and weakness, and as this seemed to be connected with the massage the latter was stopped. The speaker asked whether massage ought to be used in cases like this, in which there was a suppurating process around a tooth, when medicinal means were of no avail, and surgical measures, for one reason or another, could not be employed. In this case the massage treatment certainly had a beneficial effect as far as the pain was concerned, but was it harmful in causing the absorption of the pus?

Dr. C. L. Dana said that he had never seen any nervous disturbances which could be attributed directly to the process of second dentition. Nearly all the neuroses of childhood, such as headache and the like, develop a little later than the period of dentition. He could not now recall many cases of reflex troubles from bad teeth. He had seen a few cases of brow neuralgia, accompanied by a dilated pupil and slight suffusion of the eye, which were apparently due to this cause. There was an old medical superstition which ought to be done away with, and that was that tic douloureux was caused by bad teeth. He had had patients with this trouble who came to him with nearly all their teeth pulled out, yet their pains continued as severe as before.

In hereditary ataxia there is sometimes seen a condition of the teeth resembling very closely that described by Hutchinson as characteristic of hereditary syphilis.

Dr. Joseph D. Bryant said that he saw no need of a special instrument for the removal of the gum flaps referred to by the reader of the paper. He had always found that scissors curved on the flat answered the purpose very well.

Dr. Clement Cleveland referred to a case of severe supraorbital neuralgia coming on every afternoon, in which the pain was so intense that the sufferer was compelled to go to bed. Many remedies were tried without avail, and finally a dentist was consulted. He first removed the filling from one of the wisdom-teeth, and then, no relief following, extracted the tooth. There was found to be commencing degeneration of the nerve, but the loss of the tooth caused no diminution of the pain. A cure was finally effected by means of quinine.

Dr. V. P. Gibney said that he had found peg-teeth very commonly in hospital children suffering from joint lesions. Formerly these teeth were called scrofulous or strumous, but now they would probably be called tuberculous teeth. He had seen very few cases in

which the teeth were like those described by Hutchinson as the teeth of hereditary syphilis.

Dr. Sexton, referring to the case mentioned by Dr. Robinson, said that one of two things would have probably been found to exist: either the tooth had suppurated at the root, in which case pressure from pus or gases might have caused the trouble; or if the tooth possessed its pulp, it might be that the amalgam filling was so near that it would transmit the heat or cold. He did not mean to convey the idea that deafness was caused directly by the presence of the diseased tooth, but desired simply to refer to the conditions in which deafness might be produced by reflex causes. He referred to a case which he had seen some time ago, of a patient who had pains in the ear, chest, and various other places. He could find no trouble in the ear, and Dr. Robinson, to whom he referred the patient, could find nothing wrong in the chest. Examination of the mouth showed the presence of a carious tooth; this was extracted, but no relief followed. On more careful examination, however, an old root was found in the jaw, and when this was removed the patient recovered entirely. In the case of so-called dead teeth, as long as they remain unfilled the pus and gas will escape, but when such a tooth is filled there is no chance for the escape of the pus and gas. Filling a dead tooth is, therefore, bad surgical practice. He did not agree with Dr. Dana, that tic douloureux is never caused by the presence of bad teeth in the mouth. It might well be that no relief would follow the removal of the offending teeth, but this would not prove that they were not originally the cause of the trouble.—*Medical Record*.

THE TEETH AND THE GENERAL PRACTITIONER.—Affections of the teeth are not so often considered in our columns but that the general practitioner may congratulate himself on the appearance, in this issue, of an instructive, though cursory, paper and discussion on this subject before a recent meeting of the Practitioners' Society of New York. There is doubtless a strongly rooted reluctance on the part of the profession (and this was brought out in the discussion to some extent) to agree with the writer in respect to the importance he attaches to the dental reflex. But the candid observer can but feel that much careless dental work may be the outcome of referring dental neuroses due to caries of the teeth for treatment to persons unfamiliar, as most dentists are, with the important relations of the teeth with other organs. And where the physician is unable himself to offer any suggestions to the dentist in this regard, the patient is liable to be made worse rather than better, especially from the practice of saving so-called dead teeth. We trust the interest excited by thus bringing this subject before the profession may continue until the surgical importance of diseases of the teeth is recognized by medical men. Every surgeon now fully recognizes the importance of drainage and antisepsis in the treatment of necrotic processes, especially of the osseous tissues; and unless better means than now generally prevail—since the above well-known surgical principles are ignored in treating "dead" teeth so as to retain them in the jaws—are adopted, more or less danger is imminent in every case where the attempt is made.—*Editorial in Medical Record*.



**DIAGNOSIS OF DISEASES OF THE TEETH.**—Mr. Hutchinson said with reference to the malady known as Riggs's disease, or pyorrheic alveolaris, which is characterized by suppuration about the roots of the teeth, these themselves showing no caries, that it was first brought under his notice by an American patient who presented these symptoms, and he learned from her that this disease was common in the United States, and there known under the name of Riggs's disease, from the dentist who first accurately described and treated it. His interest was aroused as to whether it was a constitutional or local disease. It appeared to him analogous to sycosis, in which the hair falls, not simply from arrest of nutrition, but from the inflammation of the hair-follicles affecting the beard, hairy scalp, eyelashes, and in some rare instances the nails—sycosis unguis—all the toes and fingers being perhaps attacked. Is this sycosis constitutional? Sometimes it is, but much more often not. Pathologically, tinea tarsi is a contagious inflammation spreading from hair to hair, that contagion being conveyed by the pus secreted in the hair-follicle. His experience of Riggs's disease is that it occurs in patients having the best of health, just as in many cases of sycosis; sometimes there was slight constitutional disturbance, which might act as a predisposing cause. Just as in tinea tarsi the local treatment was more efficacious than the constitutional, so with Riggs's disease; but in the latter case it is not desirable to pull out the teeth, as is done with the eyelashes, in order that the lunar caustic or other drug may more readily reach the seat of inflammation, since teeth do not grow again, though the treatment must be in the same direction—namely, to dry up the secretion of the contagious pus.

**Materials Used for Stopping Teeth.**—Without for a moment disparaging the value of amalgams as a stopping-material, Mr. Hutchinson believed that in some rare instances they were the cause of intractable and irritable sores upon the lips, gums, and cheeks. He spoke simply as an observer, not knowing the chemical composition of these stoppings, many of which he was told were secret preparations; but he had certainly seen ulcers which refused to yield to treatment disappear after the removal of discolored amalgams. He had always been careful to eliminate the probability of roughness of the stopped tooth being the cause, and had never seen ulcers where gold fillings had been employed. He quoted a case of an American physician who presented a number of ulcers which several surgeons had pronounced syphilitic; the patient, however, stoutly maintained that he had never had syphilis or a symptom of it, and all his children were perfectly healthy. Mr. Hutchinson finding that he had several amalgam fillings, which had been inserted some years before in America, ordered their removal, which being done, the ulcers rapidly disappeared.

**Syphilitic Teeth.**—Mr. Hutchinson said he had little new to say on this subject. The notched incisors were now generally admitted as evidence of hereditary syphilis. The upper centrals are the test teeth, and in no single instance had they misled the lecturer; but the markings on the other teeth might be misleading, as they were often caused by the mercury given as a remedy for the syphilis, and were not due to the syphilis itself. In the great majority of cases of hereditary syphilis the markings on the central incisors are

present, but not always so. Of several members of the same family one or two might have the characteristic teeth, while the others escaped. He wished to draw attention to two points of clinical observation: (1) In all cases where interstitial keratitis occurs there are found malformed teeth, and those who have the *test* teeth characteristically marked have suffered from interstitial keratitis; (2) children who show signs of hereditary syphilis in the shape of phagedenic affections of the throat have no peculiarity of the teeth, and do not have interstitial keratitis.

*Stomatitis, or Mercurial Teeth.*—Notwithstanding that his views were not generally accepted, Mr. Hutchinson believed that stomatitis due to the exhibition of mercury did give rise to inflammation of the tooth-follicle, and that it was by far the most common cause of defects of the enamel. The first permanent molar should be compared with the temporary molars; the cusps of the former will have a spinous character and the tooth be discolored, whereas the temporary molar will have normal rounded cusps. The incisors and canines of the permanent set might be marked with transverse grooves. In cases where mercurial teeth were present, it was important to be on one's guard when prescribing mercury, as those patients had often the idiosyncrasy of being easily salivated, and he quoted a case in support of this view. In lamellar cataract, associated with malformed teeth, Mr. Hutchinson thought the latter was due to the use of mercury.

With reference to the correlation between the teeth and other structures—for instance the skin and eye—Mr. Hutchinson referred to a case reported by Mr. Moon, where there were rat-like teeth associated with micro-ophthalmos and deficiency of hair, and to a case of his own reported in the Medical and Chirurgical Society's Transactions, of a child with absolute absence of hair, and the mammary glands represented only by a scar, but with no peculiarity of teeth or eyes. A hairless puppy also showed no deficiency in milk-teeth. Mr. Hutchinson remarked that much valuable information might be gained upon this subject, if, in cases of deficiency of teeth, dentists would inquire into the state of the eyes and skin, and if surgeons, where micro-ophthalmos is present, would examine the teeth as to their character and number. It was an interesting question whether it was possible to infer from the teeth something about other tissues; and in the case of loss of teeth it was not sufficient to note that fact, but to inquire how they were lost. The tendency to accumulate tartar did not altogether depend upon the deficient use of the tooth-brush, but was more often due to the excessive secretion of saliva, and was often associated with gout. Abnormalities of the milk-teeth were produced during uterine life, and thus escaped manifestations of hereditary syphilis. The term "rickety teeth" had no definite meaning. Gouty teeth had no peculiarity, but in old medical books gouty persons were described as having the habit of grinding their teeth, and this was looked upon as indicating a gouty diathesis; hence wearing down of the teeth was often ascribed to gout.—*London Lancet*.

**COCAINE IN TEETH-EXTRACTION:**—In the St. Petersburg weekly *Russkaia Meditsina*, No. 39, 1888, page 623, Dr. I. S. Kolbasenko, of

Kopal, writes that he resorted to Dr. G. Vian's method of local anesthesia (*Therapeut. Monatschr.*, 1887, page 502) in nine cases of teeth-extraction, once in his own case. The method consists in injecting into the gum, both into its buccal and lingual surfaces, a solution of four-fifths of a grain of cocaine in ten drops of a two-per-cent. aqueous solution of carbolic acid. The following noteworthy conclusions have been arrived at by the author: 1. In the presence of an inflammatory swelling of the gum, cocaine does not develop any pain-killing effects whatever, which may be explained by the well-known fact that infiltrated tissues lose their absorptive power more or less completely. 2. But when the gum is normal, *i.e.*, not inflamed, the injection is invariably followed in a few seconds by a local numbness, and in two or three seconds, never later than in four minutes, by a complete anesthesia. The extraction performed at this stage remains always quite painless from the beginning to the end. 3. The injection, however, is constantly accompanied by a train of more or less pronounced general phenomena, such as giddiness, clouding of sight, acceleration of the pulse, and, later on, by a kind of drunkenness with talkativeness, exhilaration, etc., the symptoms being especially marked in anemic and nervous persons. In the latter a genuine hysterical fit, with clouded consciousness, tears, etc., may supervene. 4. Hence in those susceptible subjects a due caution is necessary. 5. The best means for preventing and weakening the general symptoms are these: (1) the injection should be preceded by the internal administration of a wineglassful of rum or strong wine; (2) after the extraction the patient should be placed in a horizontal posture with his head hanging down; (3) inhalation of two or three drops of amyl nitrite should be resorted to.—*Medical and Surgical Reporter*.

**CASE OF SALIVARY CALCULUS: REMOVAL.**—The following case is of interest from the comparative rarity of cases of salivary calculus, and also from the long duration of the symptoms.

J. B., a young man, aged twenty-nine, applied to me on the morning of Tuesday, February 12, complaining of a swelling under the left angle of the lower jaw. This tumor, on first examination, was found to be about the size of a horse bean, and the patient stated that every time he ate a meal, or even smelt a savory dish, the tumor rapidly swelled, and sometimes attained the size of his fist, in the course of a few minutes. When swollen the tumor caused him considerable pain; but as it subsided, which it did in the course of some half-hour or less, the pain also ceased. He stated that he had had the swelling for more than four years, and had on several occasions been advised to have the tumor removed, but had demurred.

My first impulse was to test the man's statement as to the tumor swelling up so rapidly, and accordingly I gave him an apple to eat, and I found that the swelling did rapidly increase to several times its former size. I next examined his mouth, and found that the cause of all his trouble was a salivary calculus, blocking Wharton's duct, and I then elicited from the patient that ever since he had noticed the swelling he had been troubled with dryness of the mouth, which was most noticeable on the left side. I explained the circumstances of the case to the patient, and he at once agreed to my



removing the calculus; but I found that it was impossible to do this single-handed, owing to the difficulty in fixing the tongue, so I then endeavored, and was fortunately successful, in opening Wharton's duct between the calculus and the gland, and so obviated any further swelling of the gland by the accumulation of the saliva. I then arranged that he should come to me again on the following Sunday, and on that day I was able, with the valuable assistance of my friend, Mr. H. Lloyd Williams, to remove the calculus. The patient informed me on this day that the gland had not swelled up at all since my former operation, but he complained somewhat of an excess of saliva in the mouth, and of an unpleasant mawkish taste. This was due, no doubt, to his having been for so long accustomed to a comparatively dry mouth, and the taste to the discharge into the mouth of saliva which had long stagnated in the gland.

The calculus weighed exactly five grains, and was oval in shape, about the size of a small haricot bean, and with a granular surface.—*Francis W. Clark, L.R.C.P., in British Medical Journal.*

CANCERUM ORIS SUCCESSFULLY TREATED BY LOCAL APPLICATIONS OF CORROSIVE SUBLIMATE.—Drs. Peter Yates and E. C. Kingsford report three cases of severe cancrum oris in children in the *Lancet* of May 4, 1889, which were cured by applications of corrosive sublimate. The affected parts were wiped off with a strong solution of perchloride of mercury (1 to 500), and afterwards dressed with lint soaked in a similar solution (1 to 1000). The beneficial effects of this treatment were immediately observable; healthy granulations soon made their appearance, and the wound quickly contracted. As soon as a healthy condition of the wound was insured the treatment was discontinued, and simple dressings substituted.—*Medical News.*

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## HINTS AND QUERIES.

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WILL some one give me the formula for iodol paste for filling pulp-canals?—G.  
The formula of Dr. Van Woert is as follows:

R Iodol, gr. x;  
Oxide zinc, gr. xx;  
Vaseline carbolic, to make a stiff paste.—H.

REPLY TO J. W.—Obtund the surface of the pulp by applying for five minutes some cocaine hydrochlorate just moistened with water. Then charge a hypodermic syringe with a few drops of a five-per-cent. solution; place the needle as far up into the pulp as possible, and, while carefully held by an assistant, pack soft (red) gutta-percha around the needle until the cavity is full; harden the gutta-percha by the air-syringe, and then hold a broad-headed instrument on the gutta-percha to keep the liquid from spurting out around the needle; press *very* gently on the piston, the object being to compel the pulp to take up by pressure a small quantity of cocaine. If only a quarter of a drop is taken up it will be sufficient. Wait a few minutes, and then test the pulp for sensitiveness, and if necessary repeat. The amount of cocaine used is so minute that no danger need be feared. When feeling is gone extirpate at once. Of course the dam should be used. Caution should be used to prevent going through the apical foramen, as you will not have the usual warning from the patient when you have reached that point.—D. W. B.

**SPONGE-DRESSINGS.**—Pieces of the finest, softest, and closest quality of sponge are washed clean and dried. They are then saturated with a 1 to 1000 solution of mercuric bichloride and cut into plugs of small and larger sizes, dried, and kept at hand in stoppered bottles for use. The parings, in long, slender points, are likewise conveniently preserved. I find these slips particularly valuable for applying acids, etc., in the treatment of pyorrhea alveolaris, fistulous abscesses, and the like lesions. I apply the sterilized plugs, suitably medicated when necessary, to the sockets of freshly extracted teeth. Sponge is much better for this purpose than anything else I have tried. Unlike cotton when taken from a wound, it all comes together and never leaves any fibers to hinder healing. Of course it may under some circumstances remain to serve the purposes of the well-known sponge-graft, but I find its principal and very satisfactory use to be that of a vehicle for suitable dressings.

A sponge plug saturated with a suitable styptic and covered with a larger compress plug saturated with sandarac varnish will effectively aid in controlling hemorrhage following an extraction in a patient of a hemorrhagic diathesis.

Hardly anything can be better than small sponge plugs for closing accidental holes in rubber-dam. Dip a pellet of sponge into sandarac varnish and push it half-way through the hole; it is a very bad leak if that does not stop it.—JOHN HOLT, D.D.S., Goldsboro, N. C.

**DENTAL ANOMALY.**—On July 9, 1886, I administered gas to a farmer of about forty-five years of age, and proceeded to remove the superior second molar of the left side. Upon loosening it somewhat, I discovered that there was an unusual obstruction, and, after dissecting the gum from the partially extracted tooth, at last brought away the mass, which proved to be two teeth with a portion of the alveolar process (see illustration). At first sight the small but completely formed third molar appeared to be cementally united to the roots of the second molar, but upon becoming quite dry the teeth separated, and the union was found to be merely pericemental in connection with that portion of process adjacent to both teeth.—G. W. ADAMS, D.D.S., Bristol, Pa.



**ALUMINIUM SOLDER.**—The *Scientific American* says that the following alloys may be used as solder for aluminium :

- |    |           |          |      |           |
|----|-----------|----------|------|-----------|
| a. | Aluminium | 8 parts; | Zinc | 92 parts. |
| b. | "         | 12 "     | "    | 88 "      |
| c. | "         | 15 "     | "    | 85 "      |
| d. | "         | 20 "     | "    | 80 "      |

The aluminium is first melted; the zinc added gradually. Finally some fat is added, and the whole is stirred with an iron rod and poured into molds. For flux use copaiba balsam, 3 parts; Venice turpentine, 1 part, and a few drops of lemon-juice. Dip the soldering-iron into the same flux.—L.

TO THE EDITOR OF THE DENTAL COSMOS :

SIR,—Members of the American Dental Association as well as others interested in the progress of the profession are cordially requested to furnish contributions pertaining to dental education, literature, and nomenclature in the form of papers or suggestions. Contributions should be in the hands of the officers of Section II on or before August 1, 1889.—W. H. ATKINSON, chairman, 41 E. Ninth street, New York; LOUIS OTTOFF, secretary, 70 Dearborn street, Chicago.

# A MONTHLY BIBLIOGRAPHY OF DENTAL LITERATURE.

COMPILED BY J. MELVIN LAMB, M.D., WASHINGTON, D. C.

THIS bibliography will be continued monthly in the DENTAL COSMOS, and will furnish as complete a record of dental literature as can be gleaned from current periodicals and transactions of societies.

The abbreviations of titles used are those common to bibliographical work, and will, it is presumed, be readily comprehended by any one familiar with dental or scientific publications. Any explanation will be gladly furnished by the compiler.

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ORIGINAL COMMUNICATIONS.

A STUDY OF THE VISIBLE CHANGES THAT TAKE PLACE DURING  
THE DEVELOPMENT OF HUMAN TEETH AND THEIR ALVEOLI.

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(Read before the New York Odontological Society, May 21, 1889.)

MR. PRESIDENT AND GENTLEMEN: I present for your consideration this evening a study of the visible changes which take place during the development of the permanent human teeth and their alveoli. In saying visible, I refer to those changes that any practitioner may see if he will but take casts of the mouths that come before him and carefully preserve them for a series of years. In giving attention to the changes which take place during this development, my purpose is to find out what nature has to tell us. Nature is our best teacher. If we can get her mind as to what constitutes a perfect denture and the basis of it, we shall be prepared in any case of imperfection to unite our efforts with hers to produce a normal condition, and that with large prospects of success.

The diagrams exhibited are intended to illustrate certain well-known anatomical facts, so as to open the way to some important and practical inferences.

The facts are:

1. That the jaw continues to grow from infancy to adult age.
2. That its elongation is mostly from the second temporary molar backward.
3. That its elongation depends largely upon the growth of the permanent teeth.
4. That the growth of the alveolus is also dependent on that of the permanent teeth.

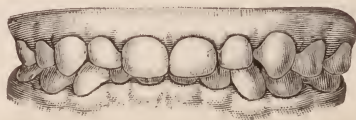
From these facts it will be inferred that the removal of permanent teeth will prevent the natural development of the jaw, the growth of the alveolus, and the attainment of the height of the

normal bite. These inferences, I think, will be sustained by the diagrams.

Now, as has been said and is generally known, the jaw grows from infancy to adult age. It is by no means as large in a child seven years of age as in an adult. To illustrate this fact, I have diagrams here from three years old to adult age. They are intended also to show the manner of the jaw's development and the growth of the alveoli, which takes place posteriorly to the last temporary molar, so that the three permanent molars on each side of the adult jaw occupy the position that was originally occupied by the ascending ramus of the child.

I will now refer you to the diagram of a mouth three years of

FIG. 1.



age (Fig. 1). The twenty temporary teeth are all in position, in good occlusion and regular, and all apparently just touching one another. The upper incisors lap over the lower. The upper molars are astride of the buccal cusps of the lower molars. The line of occlusion from incisors to molars is almost straight.

Fig. 2 represents the mouth of a child five years old. The conditions are nearly the same as in Fig. 1, excepting that spaces begin to appear between the incisor teeth. This spacing is partly due to

FIG. 2.

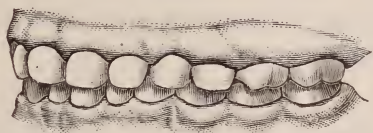


the growth of the jaw at that point, as the permanent incisors which are placed behind the roots of the teeth press their way forward and outward, and so enlarge the circle formerly occupied by the temporary teeth, and partly to the swinging forward of the lower jaw. The continued occlusion of the lower incisors against the upper has a tendency to assist in spreading the upper arch of the temporary teeth, and so assists in making room for the descent of the upper permanent teeth to their proper position.

Fig. 3 represents the teeth of a child six and one-half years of age. The spacing above is greater than in the last specimen, the jaw still growing. The first permanent molars have appeared posteriorly to

the temporary teeth, simultaneously the two central incisors below have appeared, while all of the other temporary teeth remain.

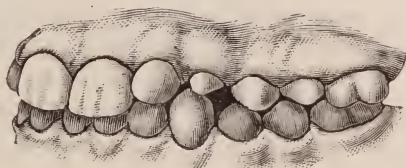
FIG. 3.



Notice also that the occlusion of the first permanent molars even at this age is nearly on a level with the temporary molars.

Eight years of age (Fig. 4). Development has progressed further,

FIG. 4.



as will be seen. The entire set of temporary teeth is gone. The occlusion is upon the sixth-year molars exclusively. The bicuspid are developing, but as yet do not antagonize. We see here how

FIG. 5.



dependent we are upon the sixth-year molar to keep the mouth sufficiently open for the bicuspid to erupt.

Nine years of age (Fig. 5). The temporary molars are all still in

FIG. 6.



their places. The permanent molars below have risen just enough above the level of the temporary molars to make visible the begin-



ning of the upward and backward curve of the molar teeth of the lower jaw. This curve has a most important bearing upon the arrangement of the teeth, their retention in proper position, and the length of the bite. Attention is therefore called to it.

Eleven years of age (Fig. 6). Several temporary teeth are still in position, but quite ready to fall out.

FIG. 6 A.

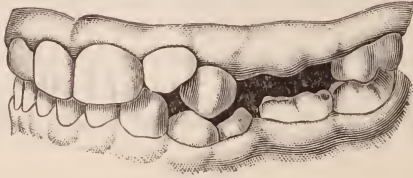
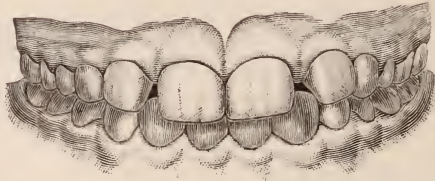


Fig. 6 A is the same mouth after the removal of two of these temporary teeth, and shows most markedly the office of the sixth-year molars.

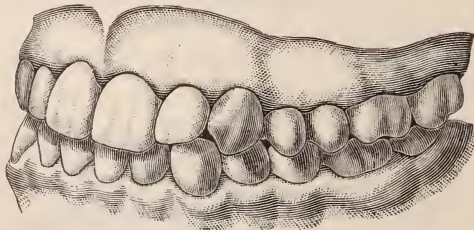
Eleven years of age (Fig. 7). The upper lateral incisors are by

FIG. 7.



the occlusion of the lower incisors prevented from proper contact with the centrals. The temporary molars and cuspids still remain in the mouth. Until the permanent molars shall have developed and lengthened the bite, these incisor teeth will continue to be held

FIG. 8.



apart as they often are when the sixth-year molars have been extracted.

Seventeen years of age (Fig. 8). This shows the growth and better articulation which generally takes place between the twelfth and eighteenth years. It will be noticed that the molars and bicus-

pids have so elongated, or, in other words, there has been such lengthening of the bite, that the lower central incisors no longer close beneath the upper centrals any farther than they ought. In this figure the proper relative position of an adult's teeth has been reached, and the overlapping of the incisors equals the depth of the cusp of a bicuspid in the same mouth. Yet the young lady has probably not reached her full stature.

Fig. 9 represents a mouth containing the whole thirty-two teeth; the same conditions as in the preceding case exist here, but it will be noticed that the lower wisdom-teeth occupy a position still higher on the curve of the lower jaw, so that the concavity of a line drawn from the top of the lower cuspid to the wisdom-tooth is distinctly marked, and into this concavity the upper teeth have developed and are held each by occlusion with the cusps of its antagonizing teeth.

If now we examine the line from the front side of the sixth-year molar to the top of the incisors, we shall find the closure of the teeth to be almost level, the marked upward curvature taking place among the molars.

FIG. 9.



Let me recapitulate the facts shown by these models and drawings. At the age of three or four years the temporary teeth are all in place and occlude or approximate one another nearly in a straight line. This continues to be the case until about eight years of age, at which time the first permanent lower molars are so far developed as to rise considerably above the level of the second temporary molar. This development upward carries with it a development of alveolus, and has been coextensive with the development of the jaw backward.

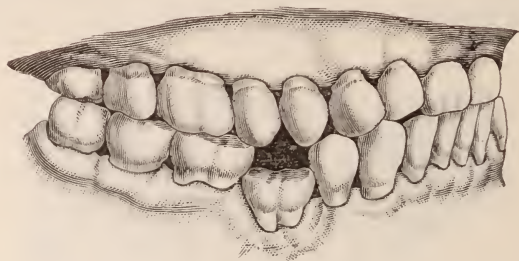
At ten years of age we find the incisors are largely developed. Between the incisors and the first molar of the lower jaw the bicuspid are erupting. At about twelve years of age the two second lower permanent molars appear. The teeth of the upper jaw develop a little later than those of the lower, the cusps of the lower teeth serving in a certain sense as matrices to catch and retain the upper teeth as they develop. The first upper molars are developed before

the bicuspid. Upon the four first molars the jaws are sustained during the time of shedding the temporary teeth and their replacement by the permanent set. Their position is just posterior to the twenty temporary teeth.

The developments here shown have been regular. The growth of the jaws and of the permanent teeth has synchronized and the bite has lengthened normally.

To show how much the bite is lengthened from childhood to adult age, I present a diagram of a model from the skeleton of a Hollander (Fig. 10). It will be seen that the development of the permanent teeth in their regular order lengthens the bite by the distance here shown, or rather twice the distance here shown, as the corresponding growth of the upper jaw must be included. Notice that the second temporary molar below was caught between the developing first permanent molar and the first bicuspid, and retains the position occupied in childhood.

FIG 10.



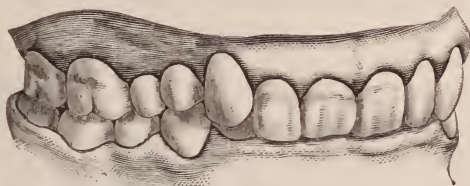
Here, then, we may raise the question, What will be the result of extracting teeth during development? For instance, what would be the effects of extracting the four first permanent molars? Plainly the development of the jaw would be interfered with by just that degree.

Take the skull of a child of five and a half or six years of age, while the temporary teeth are all in position, and cut away the anterior plate of bone so that the positions of the permanent teeth in their places may be studied. It will be seen that the crowns of the permanent teeth are lodged posteriorly to the roots of the temporary teeth; that these crowns are as large as they ever will be, and, in order to be packed in so small a jaw, that they are arranged with one another in the order of their development, which to the casual observer is great disorder. The lateral incisors are almost behind the two centrals, the cuspid teeth again far outside of the laterals and much higher than the bicuspid, occupying, in a word, just those positions that careful parents and very young dentists are anxious to regulate when these teeth have made their appearance



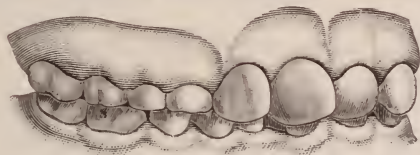
through the gum. If these four first permanent molars were to be extracted, the development of the jaw would be interfered with by just that degree of width. Observe that the second or twelfth-year molars are immediately posterior to the first molars. Their development in due course presupposes an elongation of the jaw equal to

FIG. 11.



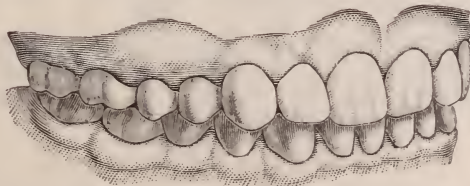
their width. The next molars will demand a similar elongation. But now, if the second molars should be extracted, the third molars, without forcing the jaw to make room for them, would move forward and occupy the places of the second molars, and hence both jaw and bite would fail to be normally developed. In illustration of this point I present here a diagram of the teeth of a mother and child.

FIG. 12.



The bite of the mother (Fig. 11) is so short that the lower incisors are completely hidden from view and wound the upper gums. Her four first molars were extracted before the development of all the teeth was complete, consequently the bite is shortened to the extent here seen. Her daughter, at about ten years of age, was

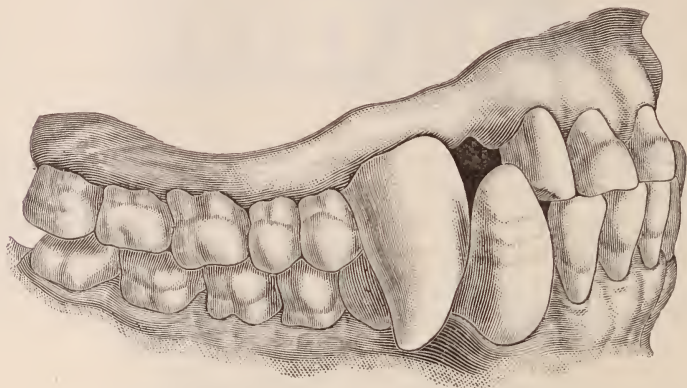
FIG. 13.



in the condition represented by this diagram (Fig. 12). I undertook to regulate this exceedingly frail and defective set of teeth, she being then about thirteen years of age. My retaining-plates were made to touch only the necks of the teeth, and were kept in position some months. At about nineteen years of age the mouth has

the appearance presented by Fig. 13. It will, as I see it, be impossible, while all her teeth are retained, that they should again become very irregular. My reason for so thinking is that the lower cuspids are the most firmly planted of all. The rule is (though there may be exceptions) that if the four lower incisors be formed into a complete arch, the abutments of which are the cuspids, and the upper incisors advanced sufficiently to close over them, the upper

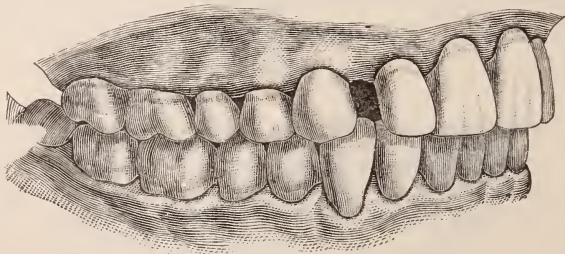
FIG. 14.



incisors will by that arch be held permanently in position, if the back teeth are regular.

Upon a recognition of this principle here involved, that the condition of the lower arch decides the condition of the upper teeth, is, I believe, to be based our success in retaining in their proper positions teeth which we have regulated in the forward part of the mouth. I have, therefore, no fear that this case of regulating will

FIG. 15.

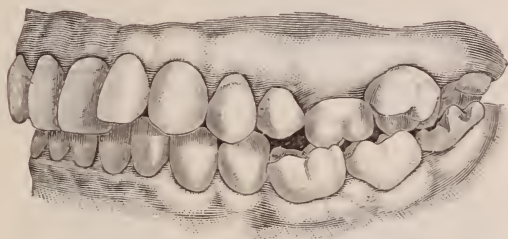


after a lapse of ten years disappoint me by returning to its original position. It may be interesting to notice the diastema that exists in the mouth of the chimpanzee (Fig. 14). It is occupied by the lower cuspid, which in these apes being quite long, strikes anteriorly to the upper cuspid. When the diastema disappears, the brute disappears and man is found. The nearest approach to this diastema

that I have seen in man I present you in model (Fig. 15). It is that of a Hottentot. It will be noticed that his inferior cuspids strike so nearly in the position of his Darwinian ancestors that the lower incisors form a complete arch strong enough to retain the upper incisors at a distance from the cuspids. The extraction of a permanent tooth, then, during the period of development results in a shorter jaw and bite than normal.

Nor is this all. Very often a further evil result is irregularity in the position of the teeth. The vacancy caused by an extraction asks to be filled; the adjoining teeth incline toward each other until contact is seemingly reached either between the teeth on the same jaw, or by occlusion with the teeth of the opposite jaw. This movement of the teeth together is a movement from behind forward almost invariably. Whenever a movement from before backward takes place, it is comparatively slight. But the whole row of teeth or a part of it may drop inward toward the tongue, narrowing the arch, as Dr. Howe has correctly described. We may expect, there-

FIG. 16.



fore, as the usual result of extracting any two of the permanent teeth on opposite sides of the same jaw, that the teeth posterior to the space thus made will lean forward very considerably, often almost destroying occlusion with their antagonists. The exceptions to this rule only emphasize our inability to foresee the cases in which it will not occur.

This irregularity in position of the teeth often leads to recession of gums and alveolus, and may be regarded as another of the results of extraction. The same thing is noticed in the lower animals where certain teeth lean over and where the tuberosity of the teeth fails from any cause to be a protection to the gum; there we are likely to have parulis to greater or less extent caused by the crowding below the gum of foreign substances. But if the bulging crowns of all the teeth standing side by side and upright touch each other, it is evident that the gums at the necks of these teeth are fully protected from injurious substances in the food which is masticated by their triturating surfaces.



To show certain effects which may follow the loss of even a single tooth I refer to Fig. 16, the diagram of a mouth about thirty years of age, whose second lower bicuspid on the left side failed to develop. The incoming molar leans forward and entirely fills the space that should have been occupied by the bicuspid. The greatest tuberosity of this molar, instead of touching the greatest tuberosity of its neighbor, leans forward so that it is nearly hidden in the gum,

FIG. 17.



and the top anterior corner of the crown strikes just beneath the tuberosity of the first bicuspid. This molar has moved forward in a direct line, and so has failed to occupy its proper place in the curve of the lower jaw. The shelf which ought to be presented on the side toward the tongue has been pushed out to a line with the bicuspid, but being wider than a bicuspid, the molar projects on the

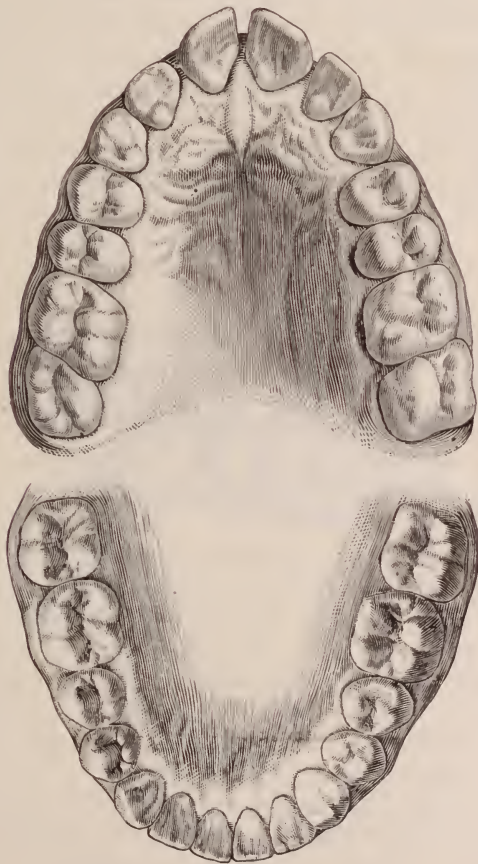
FIG. 18.



buccal side. The second molar leans forward until its top corner strikes beneath the tuberosity of the first molar. The wisdom-tooth leans against the second molar, its forward inclination being distinctly visible. Having gone so largely forward and out of the curve, the first molar was unable to catch or retain its upper occluding mate when it developed. The occlusion, therefore, is very faulty. The projecting shelf of lower molars which ought to exist on the side toward the tongue is lacking. The intermeshing of the cusps, which ought to produce a perfect triturating or milling

surface for the grinding of the food, is so nearly useless that the patient performs all the mastication upon the right-hand side of the mouth. The upper wisdom-tooth in its development impinges against the second molar; this in turn presses the first molar; and so on until the left lateral incisor projects considerably under the lip, while the right-hand side upper and lower of this same mouth is in an almost perfect state of articulation and arrangement.

FIG. 18 A.

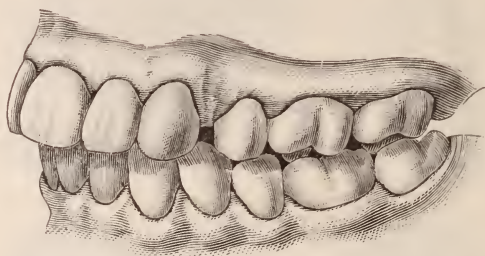


In this other diagram (Fig. 17) the second bicuspid has been extracted from the right-hand side. Almost exactly the same conditions exist as in Fig. 16.

Dr. Howe speaks of the tendency of the six anterior teeth to a retrograde movement after the extraction of the first molars. While the models already shown do not confirm any such tendency, the illustrations I here present exhibit a tendency quite opposite.

Here are two diagrams: the first is that of a young lady of about thirteen years of age (Fig. 18), whose upper incisors were so prominent that she was unable to close the lips (Fig. 18 A). Thinking that I could draw those six teeth backward, I removed the two first upper bicuspid, adapting a plate to the roof of the mouth, avoiding, as far as I could, any pressure upon the molars, and causing a bar of gold attached by screws to pass around the front of the six upper front teeth. This bar of gold had short spurs that passed between these teeth, so that when pressed each tooth moved independently of its neighbor. I seemed to obtain the most gratifying results. I cannot see how any better could have been reached; but what I *expected* would happen, and what actually has happened, are two widely different things. I present you herewith a model taken six years later (Fig. 19). The young lady is nearly twenty. Her general appearance is immensely improved; indeed, no deformity is noticeable, but in examining minutely the changes that have taken

FIG. 19.



place we see that the upper molars and bicuspid have actually been drawn forward; the bite has been shortened so that the lower incisors shut up farther behind the upper incisors than they should; they shut so far up, indeed, that they nearly touch the posterior tuberosity of the upper incisors, instead of resting just back of the cutting-edges where the tooth is thin, so that I look forward with apprehension to what might happen here in this region, should she ever lose any molar tooth.

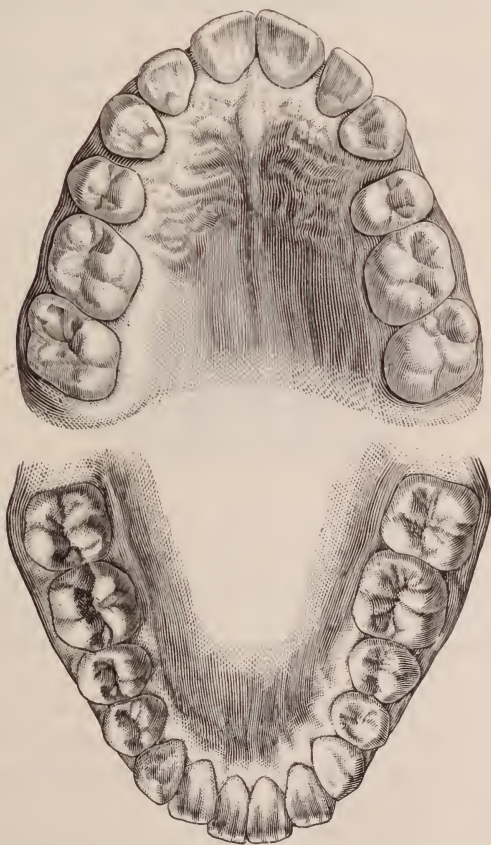
At fourteen years of age the lower cuspid stood upright, the lower first bicuspid leaned a little backward. The second bicuspid inclined a trifle forward, so that its tuberosity touched at a point the tuberosity of the first bicuspid. The first molar occupied a corresponding position to the second bicuspid, and the second molar in turn the same thing toward the first; the meshing of the cusps between the upper and lower teeth was good; mastication and trituration could be performed on both sides of the mouth.

Now at twenty what do we see? The lower incisors lean considerably forward; more than is normal. The lower cuspids are no longer



upright; the first bicuspid leans so far forward that the tuberosity of the second is quite below the tuberosity of the first, and almost the same condition exists between the molar and the second bicuspid. The lower arch (Fig. 19 A) is distinctly narrowed; and yet it will be remembered that nothing has been extracted from the lower jaw, nor has any tooth been filed. The movement that we see is entirely due to the change in occlusion, which has taken place since removing the natural support from in front of the second upper bi-

FIG. 19 A.

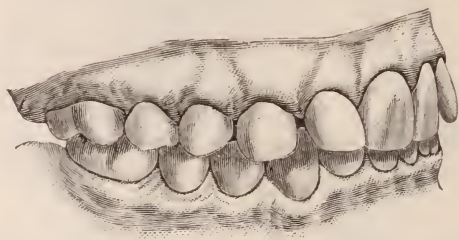


cuspid. We cannot see that the six upper front teeth have gone backward, although I tried my best to make them do so, but we do see that the back upper teeth have come forward, and in their coming forward the change in the lines of occlusion has been such that they have driven the lower teeth forward also, and in that forward movement has occurred a distinct shortening of the bite to the extent here seen.

Dr. Davenport claims that the bite will be shortened if the first molars are lost before eruption of the bicuspid. I think it generally will, but the models here exhibited show clearly that if in any given case like those of Dr. Howe's presented before us last year the bite is lengthened, it is only because of a continuation of the development in the jaw and alveolus, and the advance of the wisdom-teeth so high on the curve of the lower jaw as still to assist somewhat in the developmental process; but had the first molar teeth in these cases not been lost, the development would have gone on to a much greater extent, and the bite would have been correspondingly lengthened.

Argument as to the possibility of the bite being lengthened after the loss of teeth from the mouth of the growing child seems unnecessary. It must be conceded that the bite may be lengthened, but never can reach the normal length of the person whose teeth

FIG. 20.



have not been lost; or, in other words, that with the loss of molar teeth during the growth of the child comes a diminution of what should have been the bite, a shortening of the entire face, a diminution in the roundness of its outline, and a considerable loss of substance most perceptible in the case of ladies, but distinctly traceable in the faces of men.\*

Let me now call your attention to two other cases of interference with proper development. The one is the extraction of the twelfth-year molars, which is supposed to allow the wisdom-teeth to come forward and take their places.

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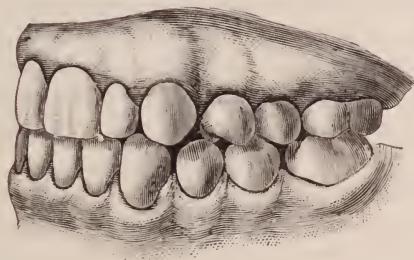
\*On page 659 of the DENTAL COSMOS for September, 1888, I am reported as saying that "there was no perceptible shortening in the bite of the two cases exhibited by Dr. Howe, yet I believe there was an actual shortening," etc.

Allow me to say, in justice to Dr. Howe's observations, that there *was* an actual *lengthening* of the bite in one, if not in both, of the models presented by him on that occasion.

What I meant to affirm was that I believed there was a shortening of the *normal* bite, and I think that position has been sustained by the evidence of the models here illustrated.

Here is a diagram of such a case (Fig. 20). The young man is now fourteen years of age. The right side of the mouth has a good occlusion, but spaces are visible on both sides of the cuspids and between the laterals and the centrals. There is no tight contact anywhere among the upper teeth, and, except for the arch of cuspids and incisors below, no close contact anywhere in the mouth. The bearing which this arch of lower front teeth has upon the regularity of the whole mouth is here distinctly visible. But before we leave this diagram I wish to call attention to the shortening of the bite, whereby the upper front incisors conceal at least half of the lower incisors, and the line of occlusion between the upper and lower teeth has again become a straight line giving the same appearance as the temporary teeth in the mouth of a child of three years.

FIG. 21.



This other diagram (Fig. 21) is that of a young man seventeen years of age, who has lost the sixth-year molars. The straightening of the line of occlusion seems to be constant in all these cases of loss of teeth during development, and is found here as in the other cases. The spacing which was desired has been procured in certain places, but not uniformly, and the developmental forces are rapidly closing them, so that when the wisdom-teeth shall have appeared (if they appear at all) there will be absolute contact of all the upper teeth with each other and all the lower teeth with each other, excepting where the occlusion between upper teeth and lower teeth shall have held certain ones apart.

From these various facts it seems evident that the extraction of teeth during the period of their development results in preventing the normal enlargement, causing irregularity among the teeth, and shortening the bite of the jaws; diminishing thereby the height of the features, impairing their strength, and injuring their contour.



## TYPICAL TOOTH-FORMS.\*

BY E. T. STARR AND F. L. HISE.

CARABELLI'S plates, published in 1844, have been accepted for nearly half a century as the standard illustrations of the typical forms of the human teeth.† As far as they go these drawings are excellent, but there are practical points of the deepest interest to those engaged in the practice of dentistry, upon which they throw no light.

The effort to perfect the shapes of porcelain teeth led to a careful study of the teeth and jaws, in the hope of adding to the somewhat meager store of exact information on the subject. This study has now extended over a term of years. One of its first fruits was the publication of the fact that, however much the crowns of teeth of a given class may differ, their necks possess typical forms, from which there are comparatively slight variations.‡

The latest results of this investigation are embodied in this paper, which is mainly a description of the plates showing typical forms of teeth, their occlusion, and the shape and action of the jaws, upon which proper occlusion so largely depends. The object is to set forth clearly the facts as found. Dentists will know how to apply the knowledge to the benefit of their patients.

The third molar has been omitted from the discussion because of its frequent and extreme variation from the generic form. This, together with the general lack of room in the mouth for thirty-two artificial teeth, long ago led to its exclusion from consideration in the construction of artificial dentures.

Plates A to N show the individual teeth, in the order of their positions in the *left* side of the jaws, beginning at the median line, the superior teeth being considered first. The descriptions apply equally to the teeth of the *right* side. Of the anterior teeth, the labial and both approximal surfaces are shown; of the posterior, the buccal and approximal. The drawings, which are diagrammatic for easier comprehension, exhibit clearly the general characteristics and the relative height, breadth, and thickness of crown and root. The sectional views show the gradual transition of the contour of the crowns from the line of the extreme outer tip of enamel (indicated by 0) to the neck form (4). The sections were cut at the corresponding transverse lines, which are at right angles to the vertical line drawn through the center of the crown so as to exactly bisect it.

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\* Copyright, 1889, by The S. S. White Dental Mfg. Co.

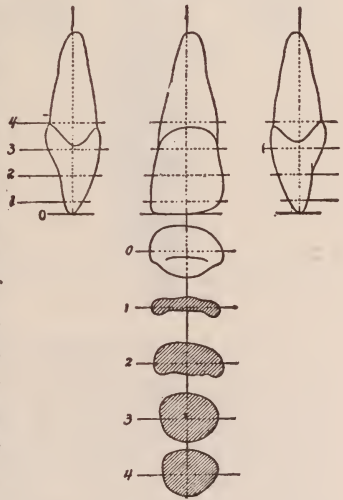
† American System of Dentistry, vol. i, p. 504, *et seq.*; Evans's Artificial Crown- and Bridge-Work, Plate IV, etc.

‡ DENTAL COSMOS, vol. xxviii, August, 1886, p. 478.

## PLATE A.—SUPERIOR CENTRAL INCISOR.

The perfect adaptation of the shape of the entire tooth to its functional use is at once seen. The first characteristic to attract attention is the spade-like form of the crown, with the sharply-defined angle of the mesial incisive edge, where the first force of incision is exerted, and the slight recession of the tip and rounded corner toward the lateral, so that the cutting-edge has a sharp pitch toward the median line of the mouth. The rapidly progressive increase of strength from the cutting-edge seen in the approximal views is still more strikingly shown in the sectional views. At 4 the thickness, a mere disk at 1, is almost equal to the breadth, which has been gradually lessened. The form at the cervix becomes by these changes a somewhat rounded triangle, the base of which exceeds the sides in length. The palatal face is hollowed out or concaved longitudinally to assist in cutting, and, to compensate for the loss of strength thus caused, the labial face is convex. The sectional view at 1 shows a slight concavity laterally of the palatal surface, with a corresponding lateral convexity of the labial surface, and a buckling or thickening of the enamel around the approximal edges. The enamel surface is longer on the palatal than on the labial face, and the root is conical.

Plate A.



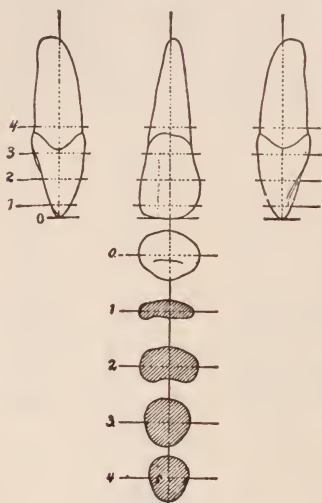
The tooth is so placed in the jaw that the two extremities of its convex (labial) face are nearly in the same vertical line; in other words, a line drawn through the incising edge and the labio-cervical margin of enamel will approach very closely the plane of the face-line of the facial angle. This disposition brings the palato-cervical margin of enamel apparently nearer to the incisive edge than the labio-cervical margin, and it also causes an apparent inward deflection of the root; but that this deflection is more apparent than real will appear from a study of the approximal views of the tooth, which show that the labial line of the root is an approximate prolongation of the final curve of the enamel face. The deflection from the median line seen in the labial view is a real deflection, arising from the necessities of the position and function of the tooth, and extends from the incising edge to the root apex.

## PLATE B.—SUPERIOR LATERAL INCISOR.

The crown of this tooth resembles that of the central in general configuration, but is smaller and relatively thicker. A similar spade-like form occurs, with a similar pitch of the incisive edge

toward the median line of the mouth, rounding off and swelling out toward the cuspid. The lingual surface is less deeply concaved both laterally and longitudinally, and the convexity of the labial surface slightly less. The relative thickening, as before suggested, is more marked, the thickness of the crown at 3 and 4 exceeding the breadth, and the base of the triangle is consequently shorter than the sides. The crown thus gains in strength from enamel tip up to gum margin, in the direction in which an increase of strength is required. The enamel surface extends about the same distance on both the labial and palatal faces, in each to nearly the same height as on the labial face of the central.

Plate B.



In the jaw the labio-cervical margin recedes slightly from the line of the labial cutting-edge. The increased curve of the labial face of the root carries its apex a little further inward than that of the central. Substantially the same deflection from the median line exists as in the central, and for the same reason. The root is conical, viewed from the labial face; somewhat irregularly shaped, with a blunter apex, seen from the approximal sides.

## PLATE C.—SUPERIOR CUSPID.

This tooth, which is commonly said to form the spring of the arch, conveys the impression, as its importance would indicate, of great strength. The crown on its labial aspect presents somewhat the appearance of a spear-head, starting from a well-defined cusp or point, and widening sharply about one-third of its length, whence it decreases gradually to the gum line. The cusp forms the division between two moderately sharp cutting-edges, of which the posterior is somewhat longer than the anterior. The approximal outlines of the crown are not unlike those of the central incisor, but more bulky. The palatal face is slightly concaved and the labial strongly convex. The shape—the provision of two cutting-edges, anterior



and posterior, meeting at an acute angle in a well-defined cusp—indicates at least an extension of function beyond the uses of the incisors. It will be seen from the sectional views that the breadth of the tooth is well maintained, while the thickness increases almost to the neck, which is of the rounded triangular shape before described. The enamel surface extends slightly higher on the labial than on the palatal face. The root, which is irregularly conical, is thick and strong, and one of the longest found in the mouth. Its labial line is almost an exact prolongation of the labial face of the crown from the line 2. The root is nearly central with the crown, viewed approxmally.

In the jaw the labio-cervical margin of enamel is nearly in the same vertical line as the labial edge of the cusp, but slightly overhangs it. The position of the root is marked by a decided prominence of the gum in the line of its axis.

Plate C.

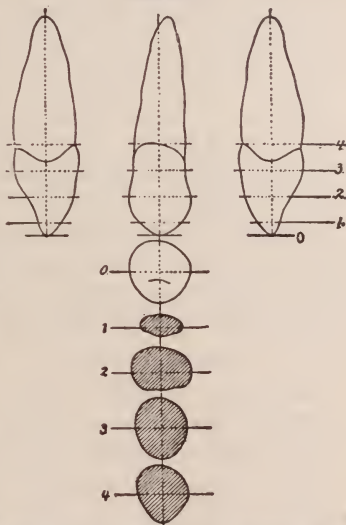
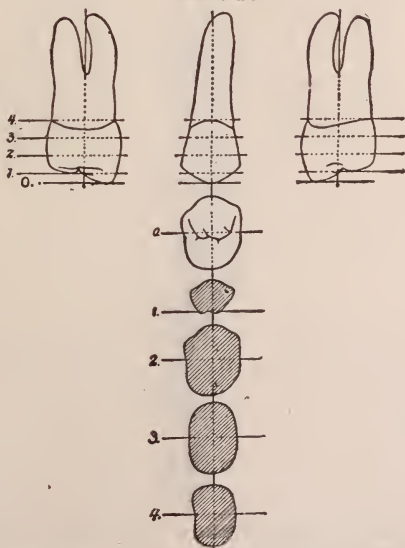


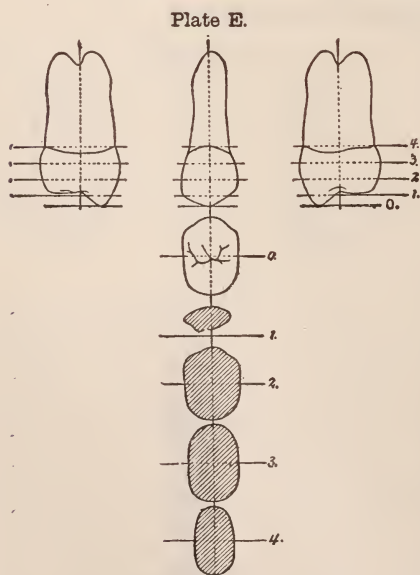
PLATE D.—SUPERIOR FIRST BICUSPID.

The buccal face of the crown of this tooth somewhat resembles the labial face of the cuspid, but it widens more rapidly from the cusp, giving it a blunter appearance; and again it narrows in almost straight lines from the point of greatest breadth to the gum margin. The anterior wall of the buccal cusp is longer than the posterior. A characteristic of the first superior bicuspid is that the buccal face is more full posteriorly than anteriorly. The sectional views exhibit this characteristic clearly, as well as the progressive changes of the form of the crown, which loses comparatively less in thickness than in breadth as the gum

Plate D.



margin is approached. When the side-views are examined, the shape of the entire tooth is seen to be different from any of those previously described. The crown has two lobes or cusps, from which it takes its name, and both buccal and palatal faces are convex. The buccal cusp, which has already been referred to, is longer and sharper than the palatal. The two cusps are connected by slight ridges of enamel along the approximal sides. The overlapping or infolding of the contiguous surfaces of the cusps causes what is known as a fissure. Normally, the fissures which are found between the cusps of all multicuspoid teeth are superficial, but they sometimes extend through the enamel into the dentine. The buccal face of the crown, owing to the length of the cusp, is longer than the palatal, though when the crown is viewed vertically the enamel surface rises to the same height on both. The root is flat, with a groove (indicated in the section at 4) running from the gum margin to the apex, deepening usually as it approaches the latter point into a bifurcation, forming what are commonly known as buccal and palatal roots, from their positions. Of these, the buccal is the longer, and is slightly curved inward. The palatal is stouter and nearly straight. Viewed antero-posteriorly, the root, whether double or single, is nearly central with the crown, but is slightly depressed inwardly near the apex. Its deflection from the median line is about as marked as in the anterior teeth.



In the jaw the buccal face of the crown is nearly vertical, viewed antero-posteriorly, and slightly pitched forward, seen from the labial face.

PLATE E.—SUPERIOR SECOND BICUSPID.

The superior second bicuspid is usually smaller than the first, which it resembles. The crown is thicker relatively, and its buccal, palatal, and approximal faces are more rounded. The general shape is well preserved to the gum margin. The enamel surface is nearly on a level around the entire cervix, being slightly higher at the center

ters of the buccal and palatal faces. The root is narrow approx- ally, thick palato-buccally, and of nearly the same size throughout.

The groove does not usually extend to the gum margin, and there is rarely more than the slightest bifurcation at the extreme end, which is usually in the shape of two cusp-like points. The vertical line through the labial face shows no deflection of the root from the median line. Palato-buccally, the root is central with the crown.

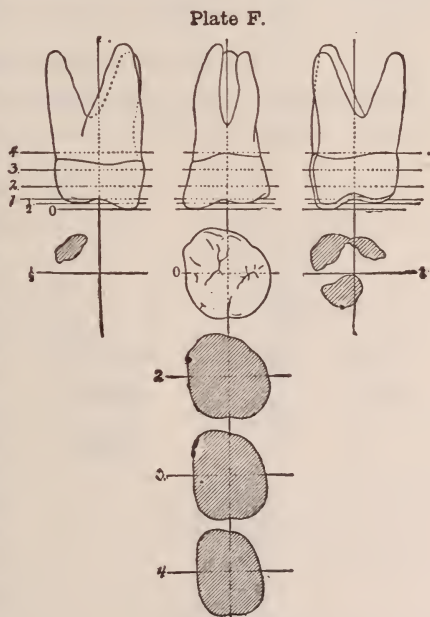
In the jaw the buccal face of the crown is nearly vertical.

#### PLATE F.—SUPERIOR FIRST MOLAR.

Here a marked change of form, corresponding to functional requirements, is manifest. The superior first molar is the first of the true grinding-teeth. Its crown is much broader and thicker than that of any tooth anterior to it. Looking at the buccal face, the crown is broadest near the masticating surface, narrowing to the gum margin in nearly straight lines; but on viewing it from either approximal face it is seen to

be larger toward the gum margin than at the masticating surface. The buccal and palatal faces are slightly convex, with a recognized depression extending from below the cusps. There are four cusps, two buccal and two palatal, which are further distinguished as anterior and posterior. Of these the buccal are the longer, the anterior buccal longest of all, giving the grinding-face a decided pitch toward the median line of the arch. The palatal cusps are broader than the buccal. To show the varying heights of the cusps, an additional section, numbered  $\frac{1}{2}$ , has been

made between 0 and 1. The crown changes but little in shape from the point of greatest circumference to the cervical margin of enamel, narrowing slightly and becoming a trifle thicker at 3, a gain which is lost at 4. Throughout it is broader on the palatal than on the buccal face, and the greater bulk of the crown is anterior to the vertical line. The enamel surface is highest along the posterior buccal and posterior approximal walls. The root is divided a short distance above the gum margin into three branches, two buccal and



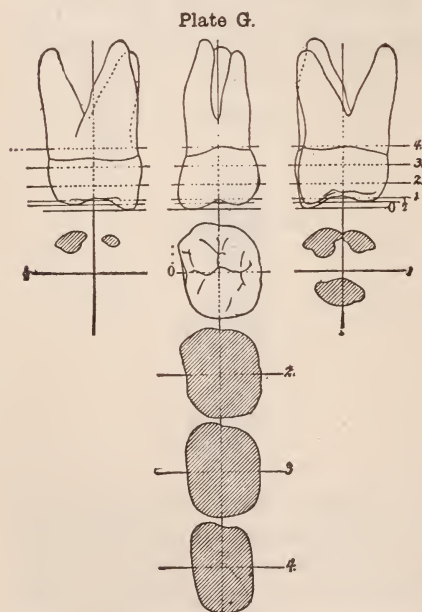


one palatal. Of these the largest is usually the anterior buccal, which springs from the base of the most prominent cusp, while the palatal is commonly the longest and most cylindrical. As a rule, the roots are more or less flattened, and when this is the case they are grooved longitudinally outside and inside. The bifurcations are usually continued a short distance into the main trunk of the root in the form of grooves. The anterior buccal root forms a second turning-point or secondary spring of the arch, and it is marked in the alveolar process by a prominence similar to that seen over the cuspid. All the roots are strongly built and more or less tapered. The points of the buccal roots are curved toward each other, while the palatal springs off at a considerable angle in a nearly straight line.

In the jaw the buccal face of the crown is nearly vertical, while the buccal roots are deflected inward slightly, but their general direction is nearly parallel with the median line of the arch.

#### PLATE G.—SUPERIOR SECOND MOLAR.

This tooth has a close relationship to the first molar in functional use, and, as would be expected, is of the same general form, with



modifications much like those which distinguish the second bicuspid from the first. The buccal aspect is wider near the grinding-surface but more rounded in outline, and the approximal faces likewise show the greater thickness near the gum margin. Passing from the grinding-surface to the gum margin, the crown preserves its general shape, losing somewhat in breadth, but gaining in thickness for about three-fourths of the distance, then tapering again. A little greater bulk of the crown is found posterior to the vertical line which bisects the buccal face. The enamel surface is highest at the

centers of the buccal and posterior approximal faces, between which points there is but little dip in its outline. The root is like that of the first molar, but the branches are larger, and the angle of the palatal is greater than that of its prototype in that tooth.

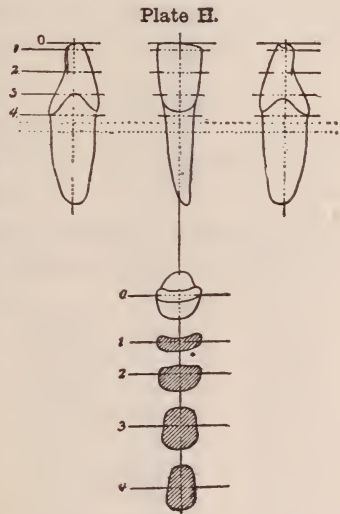
In the jaw the buccal face of the crown is nearly vertical, seen antero-posteriorly; looked at from the buccal face, the anterior lobe, owing to the implantation of the roots at a sharp angle toward the median line, is lower than the posterior, giving the crown a very decided pitch toward the median line of the arch.

#### PLATE H.—INFERIOR CENTRAL INCISOR.

The inferior central incisor is the smallest tooth found in the human mouth, and it is, besides, the only one that strikes against a single antagonist in occlusion. Its function is indicated by its shape. The same spade-like form noted in the superior incisors is here seen minified. The labial view shows the pitch of the incising edge toward the median line, and also the nearly straight outlines of the approximal sides of the crown.

The lateral convexity and concavity, and the folding of the enamel around the labial edges, are seen in the section at 1. The form changes rapidly from the cutting-edge, which is the widest portion of the tooth, to the rounded triangular—in this case approaching a wedge—shape of the cervix. The thickness at the latter point equals, if it does not exceed, the width at the cutting-edge, which has meanwhile diminished, across the center, about one-half. The base of the triangle is thus considerably shorter than the sides. As in all the other incisor teeth, the lingual face is concave and the labial slightly convex longitudinally. The enamel surface extends furthest on the lingual aspect. The root is somewhat conical, with a slight deflection from the median line near the apex. Palato-labially it is nearly central with the crown, slightly preponderating on the labial side. Its thickness is nearly double its width.

The tooth is so set in the jaw that the labio-cervical margin of enamel is nearly on a vertical line with the labial tip of enamel, the former projecting slightly. The labial fullness of the root causes a slight projection of the gum.



#### PLATE I.—INFERIOR LATERAL INCISOR.

Reversing the order in the upper jaw, the inferior lateral is larger than the inferior central, which it otherwise resembles in shape and general characteristics, except that it is more rounded in contour.

This rounding is general. The corners of the cutting-edge, which is pitched toward the median line, and the approximal sides all show it, and, as in the superior lateral, more markedly toward the cuspid. The labial face of the crown is more convex longitudinally, and the labial and lingual outlines of the root are also more smoothly curved. The lateral concavity of the cutting-edge is very slight, and the infolding of enamel only visible on the side toward the central (section 1.) The transition of shape toward the cervix is much like that of the central. The enamel surface is a little longer on the lingual than on the labial face. The root is cone-shaped, and nearly twice as thick as it is wide. It is nearly central with the crown, except a slight deflection from the median line.

In the jaw the crown is nearly vertical. The curve of the labial face of the root carries it well inward.

Plate I.

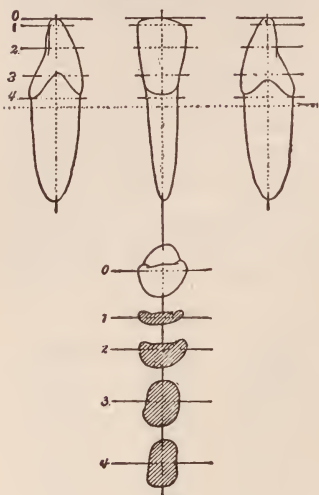
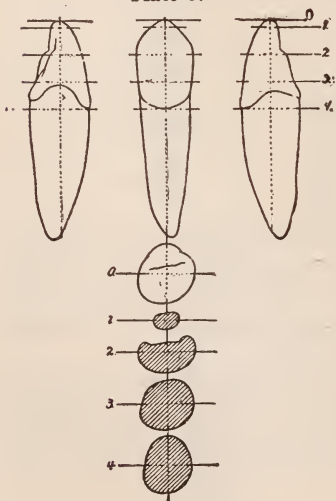


PLATE J.—INFERIOR CUSPID.

This tooth, like the cuspid of the superior jaw, forms the "spring" of the inferior arch, and in consequence is strongly built. The labial face of the crown is spear-shaped, with the posterior cutting-edge longer and more sharply inclined than the anterior. It is only slightly narrower at the cervix than at the line of greatest breadth. The thickness constantly increases until at the cervical margin it equals the greatest width. At 3 the form is nearly circular; at 4 the triangular basal form is reached. On the lingual face the crown increases in thickness very

gradually to the line of greatest breadth, where it is shouldered; thence it thickens rapidly for a short distance, and then more gradually to the cervical edge of enamel. The general effect is that of a concave lingual face. There is also a slight concavity laterally, similar to that found in the incisors (section 2). The labial face is

Plate J.



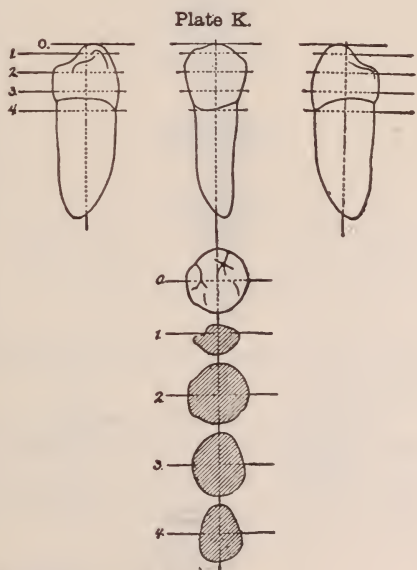


boldly convex, and the line of the face is continued almost without change of direction to the apex of the root. This throws considerably more than half of the body of the root on the lingual side of the prolongation of the vertical line through the crown. The enamel surface is longer on the labial than on the lingual face. The root is long and strong, the thickness exceeding the breadth. Viewed labially, it is conical, with a slight deflection from the median line as the apex is approached. Its lingual outline is almost straight.

In the jaw the labio-cervical margin of enamel lies a little inside of the plane of the cusp. The root causes a marked prominence of the gum over the tooth.

#### PLATE K.—INFERIOR FIRST BICUSPID.

Though called a bicuspid, this tooth has really but one well-defined cusp, which is on its buccal side. There is also a rudimentary cusp on the lingual side, which meets all the requirements, without obstructing the free movement of the tongue, as would a fully-developed cusp. The buccal face of the crown is somewhat spear-shaped, but the cusp being blunt and strong, it widens and thickens rapidly to a line about the height of the cone of the rudimentary cusp, whence the breadth gradually decreases to the cervical margin of enamel, the thickness remaining much the same. The neck form shows the rounded triangle so often before mentioned. The buccal face is convex, and the lingual nearly straight from the line 2

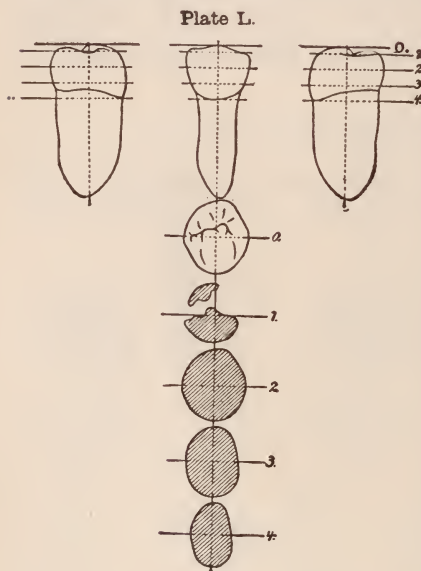


to the cervix. The greatest length of enamel surface is on the buccal face. For more than half its length the sides of the root are nearly parallel, from whatever aspect it is examined, after which the buccal wall curves around to meet the lingual, which is nearly straight throughout its length; a little further toward the apex the anterior wall curves around to meet the posterior, which is also slightly curved posteriorly. The apex of the root is thus apparently inclined inward, while it is strongly deflected from the median line. The bucco-palatal thickness of the root largely exceeds its breadth.

In the jaw the lingual wall of the crown is nearly vertical, which gives the buccal face an inward inclination. The crown has also a slight forward pitch.

#### PLATE L.—INFERIOR SECOND BICUSPID.

The crown of this tooth is shorter, thicker, and at the cutting-edge broader than that of the first bicuspid. It is provided with



three cusps, of nearly equal length, the buccal being slightly the longest. Both the anterior and posterior approximal faces are rounded, and the enamel surface extends furthest on the buccal aspect. The greatest breadth is through the bases of the cusps, whence the tooth narrows rapidly toward the neck, with comparatively little loss of thickness, which at this latter point is nearly double the width. As in the corresponding tooth of the upper jaw, the root, which is relatively short, is nearly central with the crown, showing almost no deflection from either

view, and retains its size and shape nearly to the apex, rounding off abruptly.

The inferior second bicuspid is so placed in the jaw that the convexity of the lingual face overhangs the neck. The buccal cusp is thus inclined inwardly. The shorter anterior buccal cusp wall gives it a pitch toward the median line of the arch.

#### PLATE M.—INFERIOR FIRST MOLAR.

In this tooth we reach the true grinders of the lower jaw, as evidenced by the broad, multicuspoid crown, the largest of the entire series. Unlike the anterior teeth and the superior molars, the breadth of the crown exceeds its thickness. The greatest width is found across the base of the posterior buccal cusp, whence it decreases gradually to the gum line. All four faces are slightly convex, the buccal and approximal most so. The highest line of enamel surface is along the buccal face. The excess of breadth over thickness is carried throughout the length of the crown to the

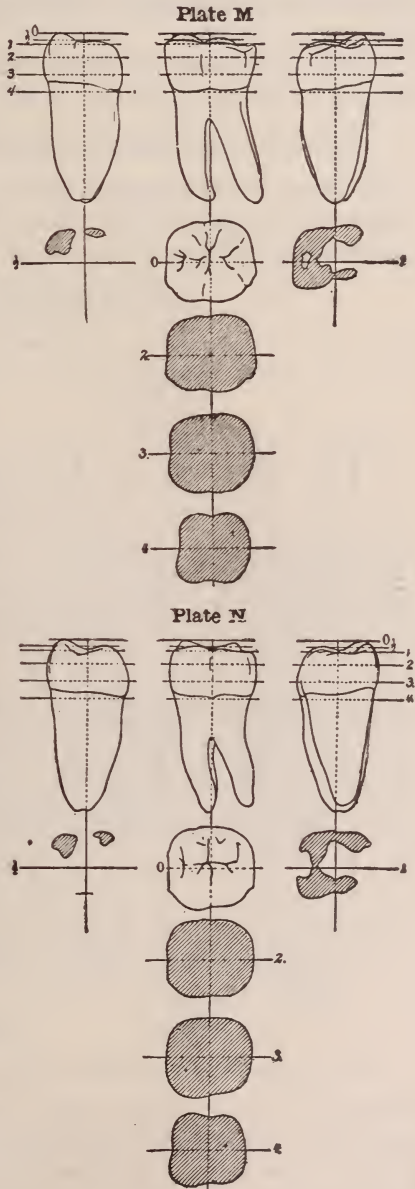
cervix, as seen in the sectional views, which show clearly the massive character of the nearly square crown. There are five cusps on the grinding-face, three buccal and two lingual. A short distance within the gum line the root is divided from the buccal to the lingual face into two somewhat irregularly-shaped flattened branches, of nearly equal size, the anterior being slightly the thicker from buccal to lingual face. Both are deflected away from the median line, the posterior more so than the anterior, and each is grooved upon its anterior and posterior surface. The bifurcation is prolonged, on both the buccal and lingual aspects, in the form of a groove, which extends nearly to the gum margin. Viewed antero-posteriorly, both roots are nearly central with the crown.

The tooth is set in the jaw with a forward and inward inclination of the crown, the roots standing in the line of the force applied as in crushing.

PLATE N.—INFERIOR SECOND MOLAR.

The square, solid form is again apparent in the second molar. Both in the buccal and approximal views it bears a close resemblance in general form to the first. Its crown has a more rounded contour, and has only four cusps, the longest of which is the anterior lingual

and the shortest the posterior buccal. The sectional views show that the greatest thickness is on a line (3) just above the gum margin. The enamel line is longest on the buccal face. The two





roots are about equally inclined away from the median line. The anterior is noticeably thicker from buccal to lingual face, and blunter pointed, than the posterior. The longitudinal groovings are the same as in the first molar.

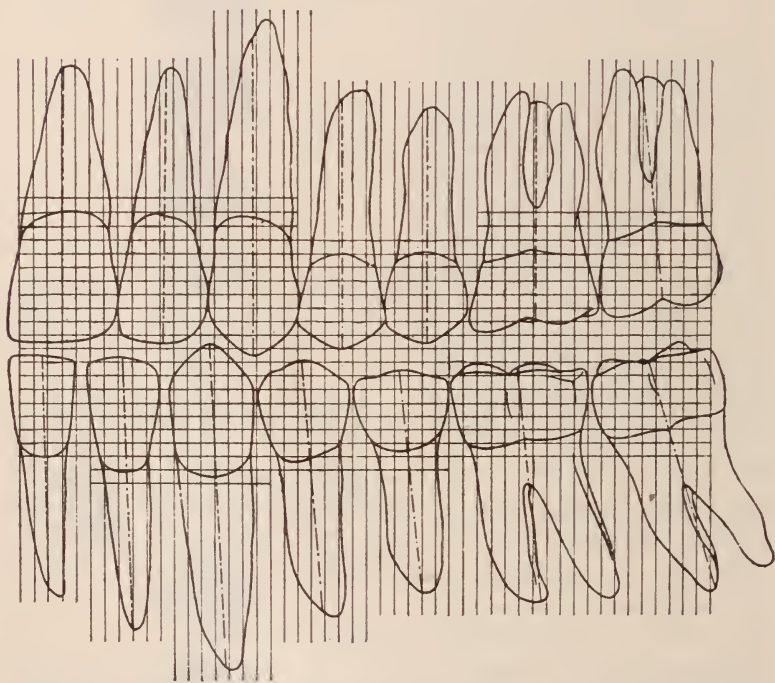
The tooth is placed in the jaw similarly to the first molar, so as to bring the crown in the line of the applied force.

#### PLATE O.—THE TEETH IN THE ARCHES AND IN OCCLUSION.

The teeth are so arranged in the jaws that the crowns do not occlude on a straight line. Both arches have a decided dip or depression, the greatest dip being between the first and second

#### ARRANGEMENT OF THE TEETH.

#### PLATE O.\*



#### THE SUPERIOR AND INFERIOR TEETH ARRANGED IN OPPOSITION.

bicuspsids. In Plate O the teeth are arranged to show the labial and buccal aspects in the relations which they sustain to one another in the arches. The vertical and horizontal lines are for the purpose of clear comparison. In occlusion the teeth of one jaw are not in exact correspondence with those of the opposite jaw bearing

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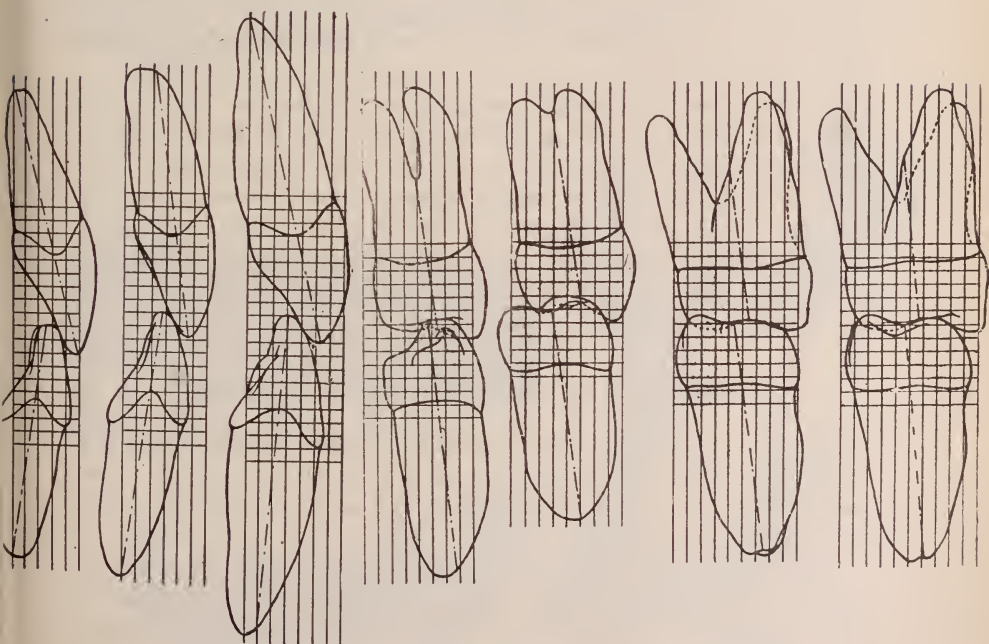
the same names. There is thus brought about an irregularity of opposition like that called by bricklayers "breaking joints," so that each tooth, instead of being antagonized by a single tooth, is met by portions of the surfaces of two teeth.

The shapes of all the superior teeth anterior to the second bicuspid apparently incline their roots away from the median line of the arch, while the crown-faces are nearly vertical. In the second bicuspid, just referred to as the limit of the downward dip of the arch, both root and crown are vertical. The superior molars, being situated on the rise of the curve, are inclined throughout, the first very slightly, the second more sharply, toward the median line.

In the inferior jaw the inclination of the root-ends away from the line is nearly constant, gradually increasing posteriorly.

The almost universal direction of what has been so frequently referred to as the pitch of the crowns in both jaws toward the median line is well shown.

PLATE P.\*



THE SUPERIOR AND INFERIOR TEETH IN OCCLUSION.

PLATE P.—THE INDIVIDUAL TEETH IN OCCLUSION.

Plate P groups the corresponding teeth of the two jaws in pairs, as they would appear if cross-sections of the maxillæ were made

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with the teeth in occlusion. The crown axial lines of the superior incisors and cuspid are nearly parallel with the labial faces of the inferior, and the former overlap nearly one-third of the length of the latter at the cutting-edges. The apices of the roots of these teeth all point inward, giving them somewhat the configuration of the staves in a barrel,—the staves converging at either end. In the bicuspid and molars a different order is found. The four inferior teeth apparently strike squarely against the corresponding teeth in the superior jaw. This is only partially true in reality. As shown in the plate, the direction of both teeth in each occluding pair is the same, the axial lines of the crowns being parallel, and, as has been previously noted, the roots are central, or nearly so, with the crowns, those of the superior directed inward, those of the inferior outward; but in occlusion each tooth is antagonized by two (Plate O). In all the teeth posterior to the first bicuspid the buccal faces of the crowns of the superior teeth overhang those of the inferior, while on the lingual or palatal faces the reverse condition is observed. The marked convexity of the buccal face of the inferior first bicuspid brings it on the same vertical line with the superior, the palatal wall of which slightly overhangs the inferior, owing probably to the absence or rudimentary condition of the lingual cusp of the latter. A fact of special importance is that the principal force of occlusion is exerted from without inwardly, the buccal cusps of the inferior teeth striking the palatal cusps of the superior, in exactly the direction in which the greatest resistance is found in both jaws. In the superior molars, for instance, the line of this force is almost exactly the line of the palatal roots, which have been well called the “props” of the teeth.

#### PLATES Q AND R.—THE MOVEMENTS OF OCCLUSION.

Plates Q and R are made from casts of natural teeth, which are mounted on the jaws to further show the relations of the teeth before described, and more especially the movements which occur in occlusion and mastication.

The superior jaw being fixed and the inferior movable, it is obvious that if the latter were pivoted exactly opposite the line of occlusion its movements in occlusion would be extremely simple. Precisely like the swinging of a door on its hinges, every portion of it would describe an arc of a circle. In the jaw, however, the hinge is placed at a point an inch to an inch and an eighth above this line, the body of the jaw carrying the teeth being suspended at nearly a right angle to the ramus by which it is hinged to the glenoid cavity. This disposition of the parts modifies the movement. Instead of



## THE SUPERIOR AND INFERIOR JAWS IN OCCLUSION.

PLATE Q \*

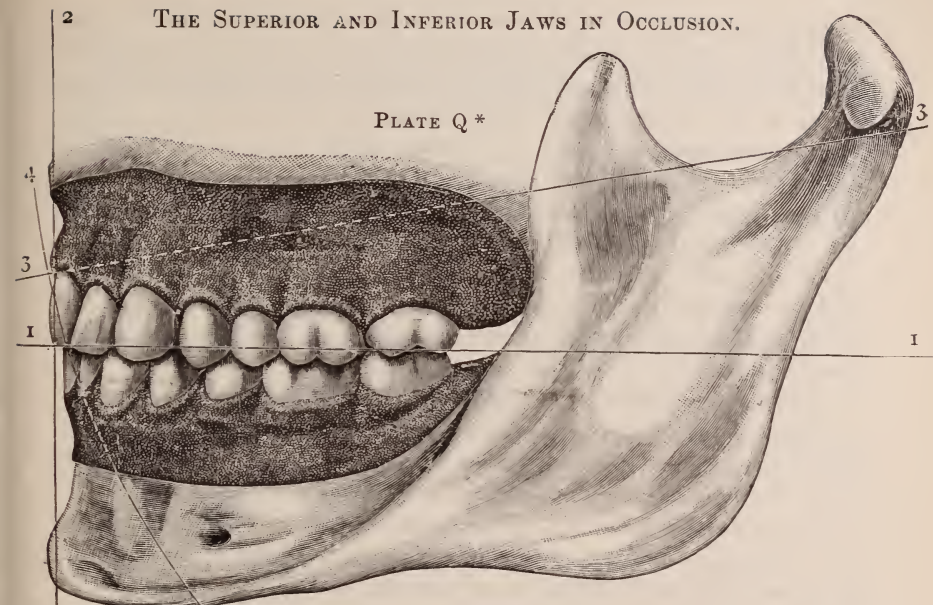
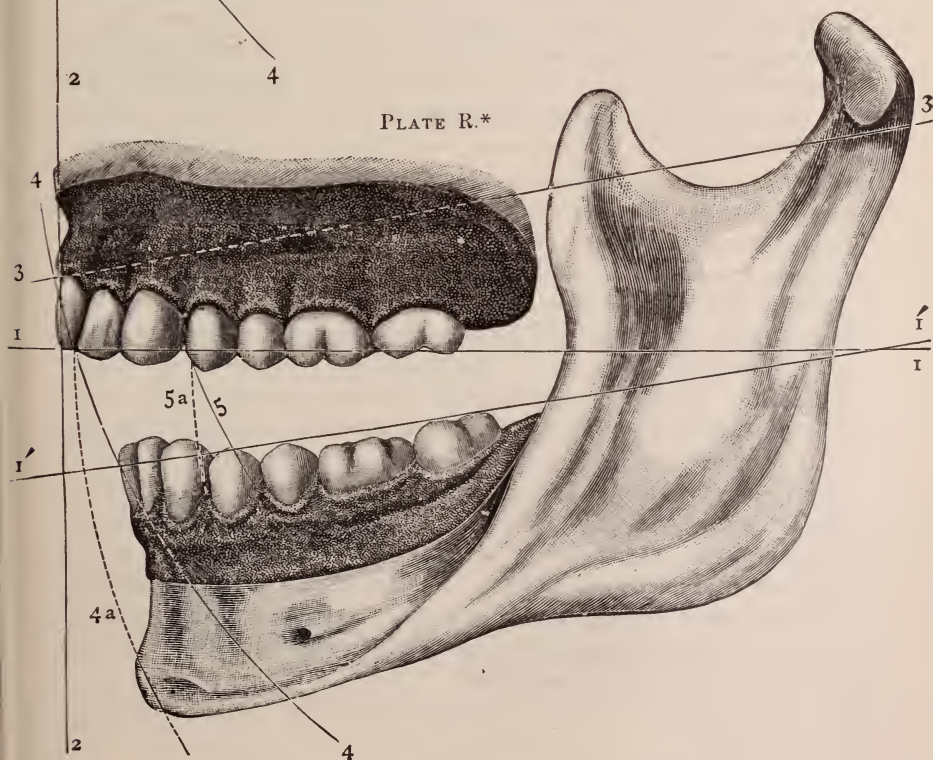


PLATE R.\*



## THE SUPERIOR AND INFERIOR JAWS OPEN.

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swinging in the arc of a circle, the body of the lower jaw is projected forward as it closes, and falls back as it opens,—a movement which is exactly adapted to bring into play in mastication the advantages of the arrangement of the teeth before described. Hence results the shear action of the incising teeth. The effectiveness of this movement in the cutting of food as compared with that which would result if the jaw moved in the arc of a circle is well illustrated by the different effects produced by pressing a sharp knife-blade against a piece of wood, and by drawing it across the wood with the same pressure. This shear action is observable in the bicuspid, in that the labial edges of their cusps are cutting-edges, and it also assists the molars in the discharge of their office.

Another movement of the jaw—rotatory or oscillatory from side to side—is due to the form of the hinge. The condyle forms a ball-and-socket joint with the glenoid cavity, giving the jaw a nearly universal movement coincident with its forward impetus.

In the plates the line 3—3 is the basal line of the head, ascertained by drawing a line from the median line at the border of the superior alveolar process to the external opening of the ear. 2—2 is the facial line of the Anglo-Saxon, at an angle of  $80^{\circ}$  to the basal line. 1—1 is the line of occlusion, passing through the extreme tips of the superior central incisor, and of the posterior buccal cusp of the superior second molar. 4—4 is the arc of a circle described from the center of the condyle—the hinge or pivot of the jaw—with a line from this point to the enamel tip of the superior central incisor as radius. For convenience of comparison the drawings are so placed that the line of occlusion is shown as horizontal, though in reality it is depressed rearwardly at about the same angle which the facial line normally forms to a vertical line.

Plate Q shows the jaws closed. The dip of the arches is well shown, as also the labial and buccal overlapping of the superior teeth.

In Plate R the lower jaw is partly opened. The line 1'—1' shows the position the line 1—1 occupies with relation to the inferior teeth, which is not so well seen in Plate Q, on account of the overlapping of the superior arch. The dropping back of the lower jaw as it opens, through being hinged at the glenoid cavity, is well shown. 5 is the arc of the curve described by the posterior edge of the inferior first bicuspid, which articulates with the anterior edge of the superior first bicuspid. 5a is the curve which it would describe, with the same articulation, if the hinge were on the line of occlusion vertically underneath the condyle. 4a shows what 4—4 would be under the same circumstances.

## PLATE S.—THE LINES OF THE ARCHES.

Some years since Dr. W. G. A. Bonwill read a paper before the Odontological Society of Pennsylvania, in which he made the following claims:

That the lower human jaw forms an equilateral triangle, the base of which is the distance from center to center of the condyles, and the sides the distance from these points to the median line of the inferior incisors, the average measurement of the sides of the triangle being about four inches.

That in ninety-five per cent. of cases the superior jaw projects beyond the inferior, the depth of the underbite varying from three-eighths to one-sixteenth of an inch, and that in not more than five per cent. of articulations do the incisors come directly together.

That the ramus has a definite curvature, and that the depth of the underbite and the length of the cusps of the bicuspid and molars correspond therewith.

That the teeth in the arch posterior to the cuspids are almost directly in a straight line toward the center of the condyles.

The substantial correctness of these conclusions appears probable.

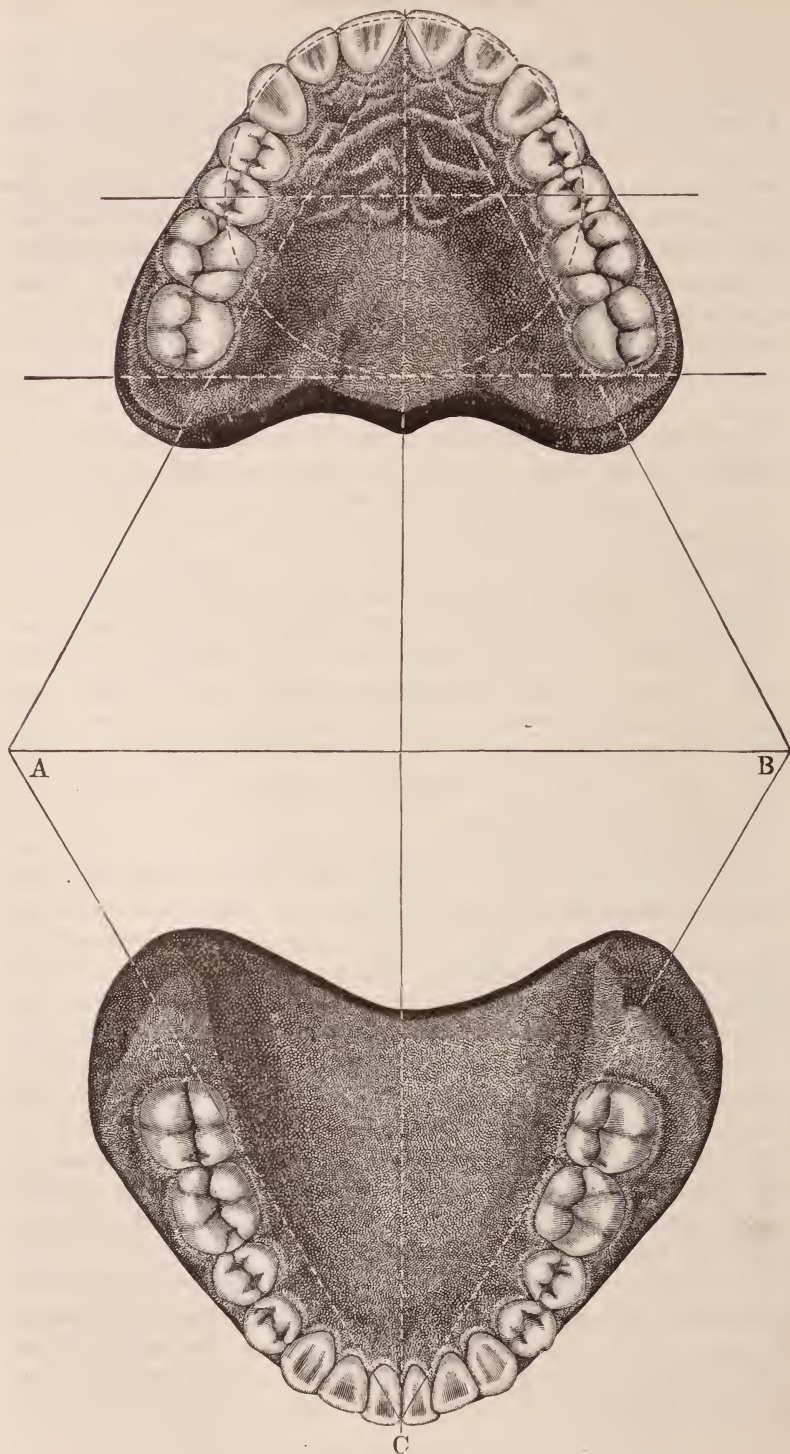
Plate S, which is a perspective view of the occluding surfaces of the set of natural teeth illustrated in Plates Q and R, shows the equilateral triangular basis of the inferior jaw. A-B shows the width of the base or hinge of the jaw; A-C and B-C show the length of the line from the condyloid process to the center of the curve of the inferior incisors.

The centers of the tips of the anterior superior teeth are in the arc of a circle, the center of which is found by measuring from between the centrals along the median line of the mouth a distance equal to the combined widths of the superior central, lateral, and cuspid, taken at the lines of greatest breadth. A line, at right angles to the median line of the head, through the center of this circle, which is known as the circle of the mouth, will pass through the centers of the second bicuspid; and a similar line, parallel to the first, through the posterior periphery of the circle, will pass through the posterior edges of the second molars.

The cuspid and the anterior buccal cusp of the first molar, it will be remembered, have been previously spoken of as forming respectively the primary and secondary springs of the superior arch; that is, they mark decided changes in its direction. In Plate S the superior central, lateral, and cuspid, as has been said, lie in the arc of the circle of the mouth. At the cuspid the direction changes; the buccal faces of the teeth between the cuspid and the anterior buccal cusp of the first molar lie in a straight line. At



## PLATE S.\*



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this latter point, which is usually prominent, the arch is again deflected slightly inward.

In the inferior jaw there is no secondary spring of the arch. The four incisors are more nearly in a straight line than their corresponding teeth in the superior jaw. The direction changes sharply at the cuspid and thence forms a continuous, gentle curve along the buccal faces of the teeth, though the lingual faces of the posterior teeth approach very closely to a straight line. (These latter points do not appear in Plate S, as the teeth were drawn in position to give a perspective instead of an exact face-view.)

#### CONCLUSIONS.

Some of the facts brought out in this investigation deserve special attention. It is unnecessary here to comment on the perfect construction of each individual tooth with relation to the use it is intended to serve; but there are a few points which it may be well to emphasize.

The cutting-edges of the incisors are, to all appearance, frail, but they are reinforced by the rapid merging of the shapes of the crowns into the rounded triangular form found at the cervix. The cervix is the point at which the greatest strain is exerted in incising, and accordingly we find one of the most powerful known forms provided to meet it, and so placed that its strongest resistive power is opposed to the direction of the force applied.

Wherever the teeth form a series, as the incisors, the bicuspid, etc., it is noticeable that there is a marked difference in the shapes of the crowns in the series. Almost invariably the posterior tooth is more rounded in contour than its anterior fellow. This has been observed so frequently that it may be set down as the normal configuration. Thus, the superior lateral is described as more rounded than the central, the inferior second molar than the first, etc. The fact seems to point to a variation of function.

Another noticeable fact is that while the buccal surfaces of the superior bicuspid and molars overhang those of the inferior, the reverse condition is found on the palatal faces, where the inferior teeth project beyond the superior. This disposition, aside from any part which it may play in mastication, affords a fender on the one side for the tongue, on the other for the cheek, so that they are not caught between the teeth in occlusion.

Many facts connected with the teeth are merely suggested or only casually mentioned in this chapter, which makes no pretension to having covered the field. The study of even the shapes of the teeth has not yet been completed. The more one investigates them, the more is found to stimulate further research. There is not a line

in the teeth or their articulations which has not its significance, and of all this comparatively little is known. Failure in operations or in the making of artificial dentures unquestionably is often due to an omission to accord to some unnoticed factor its proper practical value. A thorough knowledge of the details of the shapes of the teeth would eliminate such causes of failure.

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## THE FUNCTION OF THE DENTAL SOCIETY.

BY WILLIAM H. POTTER, D M.D., BOSTON, MASS.

(Read before the New York Odontological Society, May 21, 1889.)

SOME need must call every society into existence, and that need must determine the lines along which it must work. In supplying a need the society fulfills its functions. One of the most important of these functions is the advancement of professional education. The time was when dental education could only be obtained by personal instruction from practitioners. Now, since the formation of dental schools, dental education does not proceed from any one man or body of men, but from an incorporated institution. Dental societies, however, still have an important function in supplementing the instruction of the dental school. Consider the condition of the recent graduate. The trepidation with which he enters upon his first professional duties can only be known by experience, and is often forgotten by those of long practice. As a student in the dental school, he is under skilled direction, and though taught to think and act for himself, is really not wholly responsible for his work, and always may call in the assistance of a skilled operator. After leaving the school, this is all changed. Everyone must rely upon his own judgment, and fail or succeed according as his efforts are misdirected or well directed. Just at this point should the young practitioner be met by the dental society. It should welcome him to its social intercourse, it should admit him to its councils and deliberations. It should form itself into a consulting staff, ready at all times to give advice upon difficult cases, and thus relieve the young practitioner from the undue weight of responsibility likely to rest upon him. There are those who believe that men should be somewhat mature in professional life before being admitted to the dental society. This I hold to be a wrong idea. If the society be without true life, existing mainly in name, then the young man will miss nothing as he stands without its doors and alone. But if the society has a function, has activity, it should throw its support about the young man, assist, strengthen, and encourage him. A dental society which fulfills its function should furnish the equivalent of a post-



graduate course, lasting not one or two, but many years, for each one of its members. It is the more important that a dental society should assume the function of an educating body, inasmuch as at the present time post-graduate study is not to any considerable extent provided for by the dental schools. That such provision is not now made is due partly to an insufficient demand for it, and also to the fact that dental schools as a rule are not endowed, and have not the means to furnish instruction which is not directly profitable to the institution. This state of affairs haply may change; but while it exists, the society must take its place as an educator marking out lines of investigation for its members and expecting them to follow its instructions. It should be the privilege of a society to assign in turn to its members times when papers are to be presented requiring investigation tending to the advancement of dental science. It should be the duty of members to assume the task imposed readily and cheerfully. Not to do so must imply a disregard for the advancement of the profession, and should be deemed unworthy of membership. Dentistry is an infant profession. It needs resolute, unwearied workers to advance it to such a scientific plane that it will claim the attention of educated minds. Work to this end must be encouraged, stimulated, and directed by the dental society. The close relationship between dental societies and dental education is clearly shown by the history of the Harvard Dental School. This school was started by members of the Massachusetts Dental Society, and the great work which it has accomplished during the past twenty years stands in a measure to the credit of that society. There is a tendency, however, now that competent institutions have been established, to leave to them all matters of education. This should not be so. How many practitioners would relapse into a dull routine of practice, trying no new methods, making no investigations, were it not for the society. There the new devices of one member suggest ideas to another, and stimulate further experiment. A train of thought once started rarely runs its course without developing something of value.

In dentistry, young practitioners acquire a moderate income sooner than they would if engaged in general medicine. There is in this fact an element of danger. The young man is liable to be attracted by the dollars and cents, and, finding his time fairly well occupied, to be contented with turning to money value the skill already obtained. He may forget entirely that disinterested scientific work is expected of him, that he belongs to a profession the possibilities of which are but just being developed. He forgets that upon him depends the question whether his profession shall take its place squarely with the learned professions, having the same eagerness for the in-

vestigation of truth, the same sincerity in reporting it, the same liberal spirit, and disinterested work for the welfare of mankind. We have not behind us a long line of distinguished professional ancestors whose record for learning and investigation has given a secure standing to our calling. What dentistry is depends largely upon our efforts to-day, and especially on the efforts of the younger men in the profession.

The function of the dental society is to keep the young men moving along those great lines of study which were well started in the professional school; to see to it that financial considerations shall not prevent disinterested work. Practitioners of general medicine have a particularly valuable training in their free dispensary and hospital work. This training, while of course being of special value in the acquirement of professional skill, has another important effect. It accustoms physicians to do large amounts of work merely for scientific ends or for the good of humanity. The training of such gratuitous work is largely wanting in dentistry. The result is that unprofitable scientific work is not attractive to the average practitioner. Just here the dental society should use its influence, and while it seeks to make professional skill profitable, should so encourage scientific research as to make it attractive to all.

What broadens and liberalizes an individual or a profession is the undertaking of useful work which does not redound to the pecuniary profit of the investigator. A true investigator cannot think of profit or reward, but only of the discovery of truth.

Nothing could more rapidly elevate dentistry to a liberal and learned profession than the more general undertaking by dentists of that kind of work which is so common in medicine and which commands for it the respect of the world.

If the dental society properly performs its function as an educator and stimulator of research, then it will be in a position to perform a second function, namely, that of recording the results of investigations; the introduction of new methods or instruments. Every society of necessity keeps a record of its meetings, and in such records what transpires before the society appears. Such records, though important, are not sufficient for the proper preservation and promulgation of valuable contributions. Such contributions should not be consigned to the obscurity of a secretary's book, but should be put into print, either in a suitable journal or in pamphlet form. I have heard it said of a noted literary man of New England, that he was in the habit of immediately making a note of any bright idea which came across his mind. No matter if the idea came in the middle of the night, up he got, made a light, and put his idea on paper. Thus all available brain-power was utilized, and none

allowed to run to waste. So the dental society should carefully treasure and put into durable and readable form the many valuable suggestions which its members bring before it.

We cannot afford to throw away mental force any more than we can afford to throw away physical force or the results of physical force. I am convinced that such mental force is constantly thrown away by our societies in that they fail properly to record their transactions.

It is a fact that almost all that is valuable to our profession is first brought before a society, and by it given to the profession at large. Let the society then realize its importance as a distributor of useful information; let it undertake to educate not alone its own members, but the profession at large.

It argues carelessness, not to say selfishness, to keep silent upon matters of common concern. I do not wish to be understood to favor a word-for-word publication of everything which passes in the society; but I do insist upon the publication of useful papers, of new processes and instruments, of new ideas on old subjects, and even of old ideas upon old subjects, provided they are well and clearly stated. My point is that the dental society should assume the function of an educating body, that this work should be first carried out among its members, and then should be expanded by publication so as to benefit the profession at large.

Besides such general reasons why a society should publish its records, there are others of a more definite character which I would urge before you. In the first place, the fact that a society prints its records stimulates its members to a more careful preparation of papers to be presented. It is very easy to do careless and incomplete work provided we know it will appear only before a select few whom we count our friends, and from whom we expect charitable criticism. If, however, our work in the society is not only to pass the ordeal of our friends, but is to meet the unsympathetic review of the profession, then we are naturally stimulated to close up all weak and defective parts which would readily yield to the attacks of general criticism. There is a tendency in our profession, and in the medical profession as well, to report hastily upon methods of treatment, operative processes, or new instruments. These reports are brought to the society in the first flush of apparent success. There seems to the originator no question as to their value. A great addition has apparently been made to the quantity of established knowledge. Time, however, shows that these supposed discoveries are really of no value, and had the investigator been less hasty and more willing to prove his work, they would never have been mentioned. The printing of a society's records I believe to be a valuable preventive



for the premature advocacy of untried methods, of ill-suited instruments, of mistaken operations. A second important reason for the printing of a society's records is to prevent the patenting of instruments or methods of work. The evil results of patenting in our profession seem to me so obvious as to need little argument; and it is an important function of the dental society to oppose a practice which, in so far as it prevails, throws doubt upon our claim to be a liberal profession, and develops the selfish and mercenary side of those engaged in it. It happens that patents are secured for instruments or methods not really original with the patentee. Instruments and methods which have been long familiar to the profession, and which have been brought before dental societies, are liable to be seized upon and patented by persons seeing in them a possible money value. Such persons may honestly think that they have invented that for which they claim and get a patent. On the other hand, there are those who are ready to claim the work of others as their own, and trust to sharp management to establish their claim.

It is therefore the clear duty of the society, as far as possible, to protect its members and others from the limitations which may arise from the issuing of patents upon anything relating to the dental profession. The society must strive to do this by creating a sentiment among its members against the practice of taking out patents. It should also oppose the system by making such a printed record of all methods and inventions which come before it that they cannot be claimed as original in subsequent time by reinventors or patent-sharpers. There are many details brought before a society which seem of little importance and not worthy of record. The objection is often made that to report such details is a waste of effort, benefiting neither the society nor the profession. This objection might be true if we were not obliged to be ever on the defensive to protect ourselves against those who are trying to make revenue by patenting anything relating to dentistry. We cannot afford to give such people the advantage in a single point. We must claim and record our claim to everything which is our own, and thus, if possible, prevent its being the subject of patent.

There is a third reason why the ideal dental society should print its records. By this means it spreads information much more widely than would otherwise be possible. This thought is closely allied to the one previously advanced, that the dental society should be an educational body. Granting this fact, it should seek as large an audience as circumstances will allow. To this audience it does not necessarily guarantee that whatever it reports is of unusual worth, or that its teachings will all stand the test of time. But it should guarantee a report of faithful and original work, the results of

which, it is fair to suppose, will be of value to the profession. The society should be a pioneer in the invasion of new fields, and in the recording of facts which may in later time be brought together in the more permanent form of books.

A third, and the last function of which I shall speak, is the regulation of "ethics." The word ethics in this connection refers to a particular system of principles and rules concerning professional duty. Certain of these principles and rules are of very plain importance, and need no enforcement by the society. In this class may be mentioned the duty of each practitioner to serve his patients with his best professional skill, and to treat them honestly according to the moral code. There are other questions, however, to be decided upon by the society which are not so clear to all. In this class may be mentioned the question of advertising one's professional services. Why has not each man a right to bring himself before the public just as business firms do? Why should a society prohibit its members from this practice? Why should it say that business methods cannot be used in a profession? It is because business methods are narrow and exclusive. They seek the greatest good to the individual. Even that is stating it mildly: they very often strive to obtain personal advantage by pulling down neighbors in the same line of trade. This is well illustrated in advertising methods. Advertisements rarely furnish a calm and impartial statement of articles for sale and the prices at which they can be obtained; but they usually contain a comparison of quality and prices which is unfavorable to a neighbor and favorable to the advertiser. Such methods are bad enough in business; but what can be thought of them in a profession which pretends to be liberal? There is a wide difference between a business and a profession. The one is narrow, grasping, self-centered, illiberal; the other broad, magnanimous, and liberal. Business cannot be conducted successfully on professional principles; neither can a profession be creditably conducted upon business principles. I do not wish to cast any reflection upon legitimate business methods. In this age of close competition only the shrewdest can survive; the liberal business man will surely fail. It is, however, the duty of the dental society to see that its code of ethics rules out business principles as applied to the investigation of matters relating to the general welfare. Here we want no destructive rivalry, here we want no calculations as to the most profitable line of investigations, here we want no jealousies which will pull down one man's work to supplant another's.

The matter of advertising has, to be sure, long ago been put under the ban by reputable societies; but another practice still exists in favor which is founded upon no better principles. I refer to the

practice of patenting processes and instruments. This is as truly a business procedure as is advertising, and is especially attractive in a profession depending largely on instruments and mechanical devices of all kinds. Yet if this practice is adopted it has the power to change a man from an earnest searcher in all fields of knowledge, ready to give out generously all that may chance to be gleaned from whatever sources, to a jealous guardian of a special privilege, ready to sell rights to all who have the money to buy, and all too ready to suppress anything which may come in conflict with his interests, no matter how valuable the opposing invention may be. I do not mean to say that there are not some patentees who stand on a high professional plane. But I do believe that the tendency of patents is to illiberalize, to narrow, and make intolerant those holding them. To be of value they must be defended; opposition must be crushed out. This may be business-like, but it cannot be called professional. Let the dental society say that *its* members at least shall work for the common good; that they shall freely place the results of their inventive genius in the common store, to be drawn from equally by all members of the profession for the purposes of mitigating the suffering of mankind and restoring to function members of the highest importance to the human body. In this connection let me quote a passage from a late address of Sir Morell Mackenzie before the British Laryngological and Rhinological Society, as follows:

"No man with the opportunity of making even the most trivial original observation has the right to keep it to himself: it must be added to the common store"; and then he adds this from Carlyle: "Be no longer a chaos, but a world, or even a worldkin. Produce! produce! Were it but the pitifullest infinitesimal fraction of a product, produce it in God's name. 'Tis the utmost thou hast in thee: out with it!"

In speaking thus critically upon the functions of the dental society, I do not wish to be understood as casting upon them sweeping reflections. They have done much valuable work in the past, and I believe are ready at the present time to hold their places as zealous workers in their allotted spheres, ready to fulfill all their functions. I would, nevertheless, urge to higher planes: there are opportunities for usefulness still neglected, there are standards still unattained.

While for many reasons we ought not to be satisfied with the methods and attainments of our profession, still the work being done by many distinguished men in the line of the investigation of the causes of caries, the development of the teeth, and other not less useful branches give us ground for belief that a liberal, scientific, professional spirit is abroad among us, and that ere long the result of such examples will raise up a body of workers not to be excelled in any field.



## PROCEEDINGS OF DENTAL SOCIETIES.

## AMERICAN MEDICAL ASSOCIATION—SECTION OF ORAL AND DENTAL SURGERY.

THE fortieth meeting of the American Medical Association was held at Newport, R. I., commencing Tuesday, June 25, 1889, and continuing four days.

The officers of the Section of Oral and Dental Surgery were: F. H. Rehwinkel, Chillicothe, Ohio (deceased June 8, 1889), chairman; E. S. Talbot, Chicago, Ill., secretary.

Nashville, Tennessee, was selected for the place of the next annual meeting.

## FIRST DAY.

The Section of Oral and Dental Surgery met in the parlor of the Channing Memorial Church, at 3 o'clock P.M. The secretary, Dr. E. S. Talbot, called the meeting to order and announced the death of Dr. F. H. Rehwinkel, and said that the first business in order was to elect a new chairman. The nomination and election of W. W. Allport, of Chicago, for chairman, followed, when a committee consisting of Drs. John Marshall, J. L. Williams, and W. X. Sudduth was appointed by the chair to draft resolutions on the death of Dr. Rehwinkel.

Dr. W. H. Atkinson read a paper on

## THE ORIGIN OF PUS,

of which the following is a synopsis:

Dr. Atkinson said that by genius John Hunter, of London, had been able, as the result of his speculation and ratiocination, to declare, nearly a hundred years ago, the truth now accepted by those who had studied the question with the aid of modern instruments and methods, that inflammation is nothing more than the return of the tissues to an embryonic condition.

Within the last fifty years the views of the intimate nature of the inflammatory process have been greatly at variance. There have been three marked phases in the development of pathology within that time. First was the standard of humoral pathology promulgated by Rokitansky, of Vienna. The second was the phase of cellular pathology established by Virchow, of Berlin. The third phase, still in vogue with many pathologists, is the doctrine of emigration of colorless blood-corpuscles or leucocytes as propounded by Cohnheim, of Leipsic.

Dr. Atkinson said that he had gone through all of these phases,

but was ready now to admit that while each represented progress toward truth, none of them contained the whole truth. The nearest approach to truth that we can reach at this time is to be got from a combination of these different theories. No doubt coming decades will bring us still further forward in the understanding of the intricate processes of inflammation and suppuration.

During the past five years bacteriology has held sway in the minds of the majority of pathologists, proving what was just stated. To-day no one will be rash enough to ignore the influence of bacteria. But it has been proven that it is not the bacteria themselves, but their chemical products, the ptomaines, that play the important rôle in the causation of suppuration, and possibly inflammation. Leber, of Göttingen, maintains that it is a ptomaine called by him phlogestein that is in causal relation to inflammation.

The review of the theories held for the last fifty years is instructive in many respects. It teaches that no one, be he of the most gifted talents, is able to emancipate himself from preconceived ideas and accepted notions. And further, that we are the subjects of general theories extant at the time in which we make our investigations. It teaches us the great lesson of modesty and humility. When a man who is in the seventh decade of his life confesses that in his youth he was misled by books and teachers, and must try hard to unlearn what he thought he knew, we must acknowledge that truth can only be considered to be truth *pro tem.*,—viz., so long as we do not know better.

In the fifth decade of our century the humoral theory was held to contain the full truth in the explanation of inflammation. The older among us will remember the facts upon which this theory was based. The web of the foot of a living frog was expanded over a cork ring and touched with an irritating agent, such as a droplet of ammonia or acid, or with a red-hot point of iron, and the subsequent changes observed under the microscope with the moderately low power at the disposal of investigators at the time. They saw around the irritated portion of the web an undulation of the currents of the blood within the vessels, shortly afterward a slackening of the current, and later a stand-still of the stream. This last phenomenon they called "stasis," and this was thought to be the essential feature of the inflammatory process. It was generally agreed that the stasis was caused by a paralysis of the capillary blood-vessels after a few preceding contractions. At the same time an inundation was seen to take place in the affected tissues of a liquid which must have come from the general blood-column, and was termed "exudate." This exudate was seen to be sometimes serous, at other times fibrous or albuminous, and if blood was mixed

with it it was called hemorrhagic. Corpuscular elements seen in the affected tissues and apparently suspended in the exudate were thought to have originated from the exudate itself. Therefore the pus-corpuscles would have originated from the exudate, the latter from the blood: hence the definition of pus, "dead blood."

The ultimate cause of inflammation and suppuration was sought in chemical mixtures of the blood, termed dyscrasia, which means bad mixture of the blood. If a person became affected with lobar pneumonia, the cause surely was a surplus of fibrin in the blood, or fibrinous dyscrasia. If a person produced a number of abscesses in his organism, the cause was "purulent dyscrasia." All diseases were, in this dyscrasic view, essentially diseases of the blood.

The man who dug the grave of this humoral pathology was Virchow, in the sixth decade of this century. In his opinion inflammation was a structural change of the affected tissue, mainly morphological changes of the cells themselves. The cells being the seat of life, would attract, as it were imbibe, the exudate, swell up, divide, and come to a state of proliferation in which a number of cells would arise from an original single cell and the newly-formed cells would replace the intercellular substance lost by liquefaction. A formation of cells out of a previous liquid or semi-solid exudate was declared to be impossible, since all newly-formed cells must have arisen from pre-existing cells. Dyscrasias were done away with. The main causes of inflammation were peculiarities of the tissue itself, and a certain weakness of the tissue was proposed to explain the predisposition to inflammatory processes. The word proposed for this supposed local weakness of the tissue was "diathesis." The rheumatic had a rheumatic diathesis. Tuberculous persons were predisposed to cheesy degeneration, simply because they were afflicted with "tuberculous diathesis." In the same way hemorrhagic and purulent diatheses were spoken of. The pus-corpuscles were without exception an offspring of the previous cells of the tissue, and pus was considered dead tissue.

The third period arose in the middle of the seventh decade of our century, when Cohnheim observed a migration of colorless blood-corpuscles through the walls of the capillaries and small veins of an exposed and expanded mesentery of a frog. Similar observations had been made by S. Stricker in Vienna, and even as early as 1848 the emigration of leucocytes had been seen by Walker, of England.

Many pathologists accepted the views of Cohnheim that inflammation and suppuration are but an emigration of colorless blood-corpuscles. Stricker, by numerous experiments, undertook to disprove the conclusions of Cohnheim, and since 1880 is a convert to the teachings of C. Heitzmann, which may be briefly recapitulated



as follows: There are no isolated or individual cells in any variety of tissue, in either the animal or vegetable kingdom. Such individual corpuscles are met with only in the fluids of the body, as in the blood, where they are named red corpuscles, in the lymph called lymph-corpuscles, in the saliva called salivary corpuscles, in the sperm called spermatozoids, etc. Neither the blood nor the lymph nor any of the fluid semi-solid secretions deserve the name of a tissue. Tissue we call a continuity of not only organized material, but a material endowed with all the properties of life, such as mobility and the capacity of reproduction. An uninterrupted connection is established from one cell to another by intervening bridges of living matter. This arrangement being present throughout all tissues of animal organism, a continuity of such organism is established. Recent researches of botanists indicate that in plants also the cells are all connected by intervening bridges of living matter: that every plant is an individual from the tip of the leaves to the sporacles of the rootlets.

Let us analyze the construction of dentine in the light of this novel doctrine, for which the late Louis Elsberg, one of its most enthusiastic advocates, suggested the term "bioplasson theory."

Dentine has no cells, but is composed of a firm basis-substance (not cartilaginous as formerly thought, but glue-yielding) thoroughly infiltrated with lime-salts. This basis-substance is traversed by canaliculi, which radiate from the surface occluding the pulp-chamber, and outward to join the cement and enamel. Each canaliculus holds in it a delicate fiber, called the Tomes fiber, around which exists a minute space filled with a liquid, obviously the carrier of nutrient and denutrient substance. Fine thorn-like offshoots were known, especially in transverse sections of dentine, to emanate from the fibril, traverse the surrounding space, and fade upon approaching the wall of the canaliculus.

Now, in the light of the bioplasson theory, the Tomes fibers are formations of living matter. From them arise transverse conical offshoots penetrating the walls of the canaliculi, and in connection with a delicate, nearly rectangular reticulum traverse the whole of the basis-substance and connect the tenant of one canaliculus with the neighboring tenant directly, and therefore all the others indirectly. The presence of this reticulum was established by C. F. W. Bödecker in 1878, and the proof has been quite recently furnished by Dr. Wm. Carr, who, after decalcification of the dentine by means of a six per cent. solution of acetic acid, rendered the reticulum visible by staining with a solution of chloride of gold, and also osmic acid. These last results have not as yet been published by the observer.

Thus we can see how dentine can grow and be nourished, and realize that it is a tissue endowed with sensibility prominently at those places which abound with living matter, such as the periphery toward the enamel, and the cementum at the neck of the tooth. Therefore we can appreciate that living dentine, if irritated by a foreign body such as a mass of gold filling, or chemically by acids, will react upon this injury, become inflamed, and produce a new tissue, called osteo-dentine, sometimes more compact than the original.

This process of inflammation of dentine, called eburnitis, was carefully studied by Dr. Bödecker a few years ago; and though he has not completed his studies upon teeth which had been filled with different materials, every intelligent dentist knows that such reaction does exist. The fact is utilized by all of us in introducing highly irritant agents, such as oxyphosphate of zinc, into poorly calcified so-called soft teeth. The result after some months is a compact wall of the cavity made up of osteo-dentine, or secondary dentine, and better fitted to tolerate a gold filling than it was before this temporary filling. How can we understand these changes and the toleration of highly conductive fillings unless the tooth-substance is a veritable living tissue throughout its extent?

Whenever irritation is brought to bear upon a living tissue, reaction will follow, and this is inflammatory process. What first occurs is liquefaction of the basis- or cement-substance, probably induced by the presence of an acid, mainly lactic; thus the living matter previously concealed in the basis- or cement-substance becomes liberated, and the protoplasmic form of the basis-substance reappears. This condition has been observed by Stricker on the cornea of frogs. He saw the basis-substance in motion changing the configuration of its living matter under the microscope, much like clouds changing in the face of the sky.

Next the protoplasm furnishing the substratum of previous basis-substance becomes split up into small bodies known as medullary or embryonal or inflammatory corpuscles. Not only the original "cells," but the intervening basis-substance will participate in the formation of new elements or inflammatory corpuscles. Here is the distinguishing feature between the modern and the antique pathological views, for, according to the latter, only the "cells" were considered active and capable of proliferation.

The sum total of the newly-formed inflammatory corpuscles is known as inflammatory infiltration, which means that a certain amount of a tissue, be it connective, muscular, or nerve tissue, is replaced by and transformed into newly-appearing protoplasmic bodies in the stage of indifference,—that is, being purely protoplas-

mic bodies without any distinctive tissue character as to origin or destiny.

So long as the inflammatory corpuscles remain in continuity by their delicate offshoots they represent a tissue, though in a condition of indifference, or embryonal state. Such a tissue, by new formation of a basis-substance, will either return to the previous normal state, terminating the inflammatory condition in "resolution," or, being considerably augmented, itself will produce a tissue much greater in bulk than the one originally inflamed, and we will have hyperplasia. In neither case will the inflamed tissue cease even for a moment to be tissue.

The tissue which is the bearer of the blood- and lymph-vessels is the connective tissue, and connective tissue is the only bearer of these vessels. And here is the starting-point of inflammation in almost every instance. This we understand from the fact of the rather low dignity of the connective tissue.

We look for the greatest reaction on irritation at the source of the nutrition, obviously the blood-vessels. Muscle, nerve, and epithelial tissue react in rather a secondary manner, on inflammation of connective tissue. Virchow proposed the name "parenchymatous inflammation" for the designation of the inflammatory process, which term may be retained if restricted always to a secondary manifestation upon the primary inflammation of the interstitial connective tissue. A gland, for instance, is a compound organ, composed of a parenchyma, according to Virchow, which is the epithelial glandular tissue. This is surrounded with and accompanied by connective tissue bearing many blood-vessels. It is impossible that the glandular tissue could be the primary seat of the inflammatory process. This process will be present in the connective tissue first, and more or less rapidly invade the glandular epithelial tissue. If the connections of the inflammatory corpuscles be severed, we shall have a certain number of isolated medullary or embryonal corpuscles suspended in an albuminous liquid, and this is pus.

Pus is therefore the resultant of destroyed tissue, but quite unfit for the production of any form of tissue. How much the emigrated blood-corpuscles contribute to the formation of pus may not yet be positively stated. However, we do know positively that upon the approach of suppuration in a certain tissue its blood-vessels are destroyed without exception in the territory involved. The blood-vessels, by outgrowth of their endothelia, become at first solidified and afterward split up into medullary and pus-corpuscles, the same as all the elemental constituents. Even the smooth muscles of an artery will partake in this pus-forming process. The amount of



emigrated leucocytes cannot be great, considering the loss of the vessels which have supplied them. Pus is destroyed tissue, firstly originating in a closed cavity, bearing the name of "abscess;" or, secondly, coming from the walls of physiologically shut cavities, termed "empyema;" or, thirdly, springing from exposed tissue surfaces, such as granulating surfaces of wounds, termed pyorrhea. In the two latter instances, namely, empyema and pyorrhea, the emigration of colorless blood-corpuscles plays a far more important rôle than in the case of "abscess." In granulating surfaces of wounds especially, the source of the pus-corpuscles must be sought mainly in the capillaries which abound in the myxomatous granulation-tissue, producing loops therein, upon the grouping of which depends the raspberry look of the so-called "proud flesh."

Around an abscess a dense layer of fibrous connective tissue is formed very soon, beautifully displayed in alveolar abscess at the apices of diseased roots of the teeth. This newly-formed layer represents the productive activity of inflammation, being hyperplastic fibrous connective tissue, more or less well supplied with blood-vessels. Old pathologists termed this layer "*membrana pyogena*," which signifies that the membrane itself produces the pus. This view was abandoned long since, and to-day the *membrana pyogena* is known to be a secondary formation on the appearance of abscess,—as it were, a protective wall to the healthy tissues. After the evacuation of the pus from an abscess or an empyema, either by spontaneous rupture of the covering layer toward the surface, or artificially by knife or caustic, the *membrana pyogena* changes its character, and becomes the seat of an acute inflammation which leads to the formation of a freely vascularized myxomatous tissue. This is what is called "proud flesh," or granulation-tissue. In all instances of loss of tissue by suppuration, the final result is the formation of a scar. This consists of a dense fibrous connective tissue, whose bundles freely interlace, and which is, as a rule, scantily supplied with blood-vessels. It is an outcome of myxomatous granulation-tissue, and is covered with epithelium whenever the pus has been discharged through the skin or mucous membrane, which themselves appear in a normal condition with an epithelial layer.

Pus, therefore, is a tissue disintegrated and broken up into indifferent or medullary corpuscles which are suspended in a liquid more or less rich in albumen. The pus-corpuscles remain alive as long as the liquid surrounding them is sufficient for their nutrition. Even fatty degeneration of the pus-corpuscles, as seen in chronic abscesses, will not altogether deprive them of their vital phenomena. Such corpuscles, if transferred upon a slide, remain ameboid, and they

die only after exposure to a low temperature or after the addition of chemical reagents, or within the body by being deprived of their nourishing liquid. The last condition is noticed in the cheesy degeneration of the pus so often met with in tuberculosis.

A question now arises: What is the cause of the formation of pus? Ever since the famous experiments of Cohnheim and Counsellman, who introduced vials filled with croton oil under the skin of rabbits with antiseptic precautions, and, after healing was complete, cracked the vials subcutaneously, thus producing an abscess, this is a much-mooted question. A host of experimenters who have repeated these trials have taken views *pro* and *con.* of the question.

Dr. Atkinson considers the experiments of P. Growitz and W. de Bary, published in *Virchow's Archives* (1887), the most valuable testimony toward settling this question. They found that the subcutaneous solution of chloride of sodium in rabbits and dogs was followed by edema, a swelling of the fascia, but no suppuration. It makes no difference if the solution be mixed with a large number of staphylococci. Staphylococcus, with its three varieties, the staphylococcus pyogenis, aureus albus, and citreus, first discovered by Rozenbach, was thought to be essential to the production of pus, and even H. Knapp, of New York, maintained that a small quantity of croton oil mixed with olive oil will not produce suppuration if introduced into the anterior chamber of the eye of the rabbit, whereas the same mixture, if contaminated with pure culture of staphylococcus aureus, will invariably be followed by suppuration under like circumstances.

Growitz and de Bary, on the contrary, have proven that not only the coccus named, but certain irritating reagents and different products of micro-organisms,—not necessarily the staphylococcus,—different alkaloids, or ptomaines, are productive of pus.

Solutions of nitrate of silver, if injected under the skin of dogs, rabbits, rats, or mice, will be harmless if weak,—not stronger than half of one per cent.; but when five per cent. in strength, will invariably be followed by an abscess in dogs. Neither acids nor alkalis cause suppuration, except the liquor of caustic ammonia, which, if introduced in full strength, is followed invariably by suppuration.

In neither of these instances were there any micro-organisms discoverable in the pus freshly removed from the abscess, or transferred upon nutritive gelatine as a culture-medium.

Oil of turpentine in rabbits and guinea-pigs did not induce pus, even though injected in large quantities, but only inflammation; whereas in dogs oil of turpentine, which is a strong germicide, after subcutaneous injection was always followed by suppuration.

From these experiments it follows that chemical substances entirely free from bacteria and cocci are inducive of suppurative

processes in different animals. On the other hand, it was experimentally proven that the injection into the normal subcutaneous tissue of dogs and rabbits of the cultures of staphylococcus will not induce inflammation or suppuration. It is necessary that a tissue first be irritated to a condition of inflammation, by traumatism or by chemical irritants, to have a soil favorable for the development of staphylococci which under these circumstances will produce an abscess.

Lately, P. Growitz has shown that the subcutaneous injection of ptomaine derived from putrescent organic material called cadaverine will always lead to the formation of abscess.

From the practical stand-point it is of the utmost importance to work antiseptically, or, in other words, with such degree of cleanliness that the introduction of micro-organisms or their ptomaines becomes impossible. It is well established that even open fresh wounds, if aseptically dressed with gauze saturated with 1 to 1000 solution of corrosive sublimate and left alone for a few weeks, will kindly heal without one single drop of pus. Corrosive sublimate and carbolic acid are still most reliable germicides.

We are not yet prepared to assert that micro-organisms alone cause suppuration, since there are irritating chemical substances whose introduction into the body may likewise be followed by this process. Recent observers have maintained that there is a marked difference between a mere accumulation of leucocytes and an abscess proper. In the first case, there may be present a serous or fibrous exudate entangled with a number of emigrated leucocytes without a loss of tissue; without, therefore, suppuration. In the latter instance, a certain amount of tissue is destroyed, and directly transformed into pus. If this view be correct, it certainly strongly supports our present notions of the process of suppuration herewith presented in this résumé:

1. Inflammation is a disturbance of nutrition of a tissue, causing a recurrence of the embryonal condition of the tissue involved.

2. The embryonal condition is established by the breaking up of the tissue into those medullary or indifferent corpuscles which at an early stage of normal development have built up the tissue.

3. The medullary corpuscles arise not only from the protoplasmic bodies of the tissue, the so-called "cells," but also the intercellular or basis-substance is productive of such corpuscles, as these have shared in the formation of basis-substance in the process of normal development.

4. The medullary or indifferent corpuscles will still represent a tissue so long as they remain interconnected and continuous. By a simple reappearance of basis substance the most favorable termination is established,—so-called "restoration."



5. If the inflammatory or medullary corpuscles have largely augmented, a number thereby remaining in original connection, the result will be productive, viz., with a newly-formed tissue of increased size, a so-called "hyperplasia."

6. If the inflammatory corpuscles springing from previous "cells," basis-substance, and blood-vessels, break asunder and become isolated, they will be suspended in an albuminous liquid; they will henceforth represent pus-corpuscles.

7. Pus, therefore, is a destroyed tissue broken up into its constituent elements, and as such unfit for production of a new tissue, although the single pus-corpuscle will remain alive and ameboid almost indefinitely if it receives nourishment.

8. The emigration of colorless blood-corpuscles certainly participates in the formation of pus and in the purulent discharge of proud flesh or granulation-tissue, and is probably the main source of the pus.

9. Suppuration is caused by the presence of certain microbes, mainly the three varieties of staphylococcus, only when a previous inflammation be present in the tissue, furnishing a favorable soil for the development of the before-mentioned microbes.

10. Staphylococcus is not the only antecedent of suppuration, it having been proved by experiments that the introduction of certain chemical agents unfavorable to the development of microbes may likewise be followed by suppuration.

### *Discussion.*

Dr. W. X. Sudduth said the thoughts presented about the change in our views in regard to the origin of pus were correct. The tendency in all discussions is for each one who takes part in the discussion to be extreme, and to uphold and defend one side without being willing to admit the truths, or even see them, which are on the other side. Five years ago it was held that staphylococci were the essential factors in pus-formation, but clinical experience has demonstrated that pus may be formed where there can be no micro-organisms, and even those who most stoutly denied this then must acknowledge it now. There can be no question that these micro-organisms do produce pus, but they are not the only factors able to produce it. It has been shown that certain irritating chemical substances, and it is thought that even the extremes of heat and cold, will have the effect under certain conditions. In dentures the breaking down of the tooth-substance may be due to the effect of lactic acid on the lime-salts, but the final and characteristic breakdown which we term caries can only be effected by a ferment. The term "return of tissue to embryonal tissue" is a relative one, and

only refers to appearance. The tissues when living consist of cells surrounded and nourished by protoplasmic mass; when this is destroyed and the naked cells are seen, the appearance is similar to embryonic cells.

Dr. C. A. Brackett said that he gladly expressed his high appreciation of the paper, and noted with pleasure that those who were investigating these processes were getting nearer in accord. It was true, in many scientific investigations, that too much prominence was given to one phase of the subject, and that when one scientific fact in regard to a subject was discovered it was too often thought that all was discovered. In regard to the destruction of the teeth, it was not from one cause but from a combination of agencies.

Dr. Sudduth. The intervening tissues are not living tissues. The life is in the nucleus, and only as the nucleus acts on the tissue surrounding it can that tissue have life.

Dr. Atkinson. That last remark of Dr. Sudduth covers the point I wish to make. The nuclei are all united by filaments which reach from one to the other, and the whole body, whether it be an animal or a plant, is all one, all living cells being united with each other. I am exceedingly disappointed because I failed to get specimens which were to have been ready, which would have enabled me to demonstrate this vital connection between the individual cells.

Dr. Sudduth. I have always believed only what I could see and demonstrate. In my microscopical work my observation may not always be correct, but I try to be accurate. Dr. Atkinson, however, goes into the theory so deeply that his theories affect what he sees and takes cognizance of. When I speak of living matter, I mean matter which has the power of reproduction. A living cell consists of a nucleus which will divide up into several like nuclei, and while it is capable of doing this it lives. The intercellular substance, the cell pabulum, that upon which the cell lives, is not the living matter, but is made up of the food which we take daily: the life lies in the cell itself.

Dr. Atkinson. Dr. Sudduth said a good thing when he said that heat and cold would cause the formation of pus. This is true. It is true, too, that we, by the heat of our discussions and the coldness of our affections toward co-laborers in scientific fields, may break down the ties of fellowship which should bind us, and destroy our usefulness to ourselves and to society. We are getting now to a point where we find we can agree on many points, and when I hear Dr. Sudduth I learn something of him, and he incites me to renewed investigation. Every one who knows anything of microscopy knows that if two persons look through the same instrument at the same slide they are not likely to see just alike. We see ac-

according to our ability to see; and as this increases our vision will be clearer, and we will be better prepared to see all the truth, not a part, as we see now.

Paper passed.

Dr. William Carr, of New York, read a paper on

#### DISEASES OF THE ANTRUM,

of which a synopsis follows:

Dr. Carr said it was the object of the paper to present a few practical observations on suppuration of the antrum, as this was a disease of a part of great interest to oral surgeons.

Different authors have different theories as to the causes leading to suppuration. The throat specialist and the dentist each views it from the stand-point with which he is most familiar, and it is not easy to estimate the specific causes which produce the greatest number of cases. Zuckerkandl, in his treatise on "The Normal and Pathological Anatomy of the Air Passages," claims that a majority of the cases of suppuration of the maxillary sinus result directly from the extension of the inflammatory process of the nasal mucous membrane, produced by continuity of tissue. That is to say, that rhinitis, either chronic or acute, may cause an inflammation of the sinus and consequent suppuration. Zuckerkandl further says, "My experience with the inflammatory diseases of the lining of the maxillary sinus is that they mostly follow pathological processes of the nasal mucous membrane, and accordingly the soft parts of the nasal and maxillary cavities are generally diseased together." This view is coincided with by a number of authors. From advance sheets of a new work on the nose by Dr. Bosworth it is observed that he maintains that few if any cases can be traced directly to this cause, claiming that inflammation of the mucous membrane shows but slight tendency to extend from one anatomical region to another. This is doubtless true. We have all observed that an inflammatory condition of the mucous membrane of the oral cavity, although severe, seldom extends to other anatomical regions. Dr. Bosworth states that "but few patients suffer from antral disease compared with the great number who are affected with chronic rhinitis," though he does admit that in many cases hypertrophic rhinitis produces antral disease,—not by extension, but because this hypertrophic process in some manner causes occlusion of the ostium maxillare.

In his book on "Diseases of the Nose" Dr. Watson, of London, says that nasal polypi are the most frequent causes of suppuration of the maxillary sinus, because in nearly every case they originate



near the ostium maxillare, and, as they develop, they produce an occlusion of the orifice.

Boerhave's researches show that "in its normal condition the antrum contains a bland, inodorous, gelatinous, colorless fluid;" that this secretion keeps the walls moist but does not accumulate in the sinus, it being partly absorbed and, possibly, partly evaporated by the passing air-current. But should causes operate to close the orifice of the sinus, the external air could not penetrate into it, nor could the air already in the cavity escape from it. In this case the vascular system would act as a medium for the gradual absorption of this confined air, which would necessarily be replaced in the sinus by the secretion. But as this secretion could not be absorbed as rapidly as exuded, the air yet remaining in the cavity of the sinus would decompose the accumulated mucus, thereby causing irritation and disease of the mucous membrane. Then by closure of the ostium maxillare it is possible for the antrum to become diseased, and, with its increased secretion, to produce ectasis of the sinus.

From this we can readily understand how nasal polypi and chronic rhinitis may in many cases produce antral disease. While he admits that antral diseases are produced by these causes, yet he is convinced, from the number of cases which have come under his observation, that fully eighty per cent. of the cases of suppuration of the antrum are caused directly or indirectly by diseased teeth. When the anatomical relation of the teeth to the antrum is considered,—separated only by a thin layer of bone, and frequently the roots of the teeth forming protuberances in the floor of the antrum or actually penetrating into it; when the vascularity of the alveolar process is considered, and the frequent pathological changes of the teeth and their alveoli,—these changes being pericementitis, alveolar abscess, alveolar periostitis, and necrosis,—it may be easily comprehended why diseased teeth cause such a large percentage of antral disease.

The symptoms of antral suppuration vary with the exciting cause. When the ostium maxillare is closed either by hypertrophy, nasal polypi, or inspissated mucus, the first symptom may be only slight febrile disturbance; but the disease is often ushered in by intermittent fever and rigors accompanied by violent pains, a sense of weight and pressure in the sinus, with distension of its walls, soreness of the teeth, and edema of the cheek. If the suppuration is due to defective teeth, the above symptoms are usually absent, but there is a copious discharge from the nostrils. The natural orifice into the meatus is usually found unobstructed, and the mucous membrane of the facial surface greatly congested, as in

severe cases of pericementitis. After diagnosis has been established, the treatment of antral suppuration is simple in its character. If caused by an obstruction of the ostium maxillare, the obstruction should immediately be removed, and an effort made to effect a cure through the nares. Should this be unsuccessful, the question will arise, Where shall an opening be made for evacuating the sinus of the accumulated secretions, and for subsequent treatment? Various operations have been suggested, and, owing to a natural hesitancy to remove sound teeth, it has been suggested that an opening be made in the meatus below the inferior turbinated bone. He thought this operation unjustifiable, because, though the opening could be made without difficulty, it would be repugnant to the patient, seeming more formidable than it really is. Nor would it afford the same facilities for thorough cleansing as would an opening through the alveolus. He would make an opening through the alveolus even at the sacrifice of a sound tooth, and, in such a case, in the choice of the tooth to be extracted he would be governed by the character of the tooth, always selecting the weakest. The second molar would be chosen usually, as it makes an opening nearer the center of the floor of the antrum; but if either the first or the third molar or the second bicuspid is defective, this should be sacrificed in preference. Should it seem best to extract the second bicuspid, the opening should be drilled upward and slightly backward, as at this point the floor of the antrum is thicker than at the other points mentioned. In case the teeth on the affected side are all missing, the point corresponding to the second molar should be chosen. If the trouble arises from decayed teeth, and necrosis is present, all necrosed bone should be removed. Before commencing either to remove necrosed bone or to make an opening into the antrum, a ten per cent. solution of cocaine should be applied to the gums three or four times, in order to produce local anesthesia of the mucous membrane. The operation is then performed with but slight inconvenience or pain to the patient. The opening being established, the antrum should be thoroughly cleansed with tepid distilled water, to which a little salt has been added, until all traces of pus have disappeared. If the discharge is offensive, the cavity should be syringed with a solution of permanganate of potash and dressed with a stimulating solution composed of carbolic acid one drachm, glycerine one ounce, and distilled water seven ounces; or, if it is preferred, Dobell's solution or Listerine may be used. The cavity should be cleansed twice daily with salt water, followed by either of these stimulating solutions, until the discharge diminishes, when once daily will be sufficient. Should the orifice in the meatus be closed by inspissated mucus, the patient should be instructed to use

either of the above stimulants several times daily, by means of a nasal spray, until the obstruction is removed.

Some practitioners insert a silver drainage-tube through the orifice, kept in place by ligatures. He sees no advantage to be derived from this practice, as thorough cleansing twice daily is all that is required. Besides, there is always the possibility of food being pressed through the tube into the sinus or of becoming clogged at the entrance, so that the object sought is not obtained. The better method is suggested by Dr. Abbott, of closing the opening by means of a broom-straw, serrated and wrapped with carbolized cotton, then pressed firmly into place, and retained by means of ligatures to the teeth. If there are no contiguous teeth, a plate may be inserted with a projection one-half the size of the orifice, the projection wrapped with carbolized cotton to fill the space. This is sufficient to exclude all foreign substances. When the discharge ceases, the cotton should be lessened in quantity daily; thus the orifice will be permitted to close gradually. This treatment Dr. Carr finds all that is necessary, and in his hands it is uniformly successful.

Dr. Carr gave the following history of cases which he has treated:

CASE I.—Mr. M., aged thirty-three, who had until two years before been in perfect health. He then noticed an offensive discharge from the right nostril, which usually disturbed him greatly upon retiring, causing violent coughing when lying on the left side. Also, upon arising in the morning, he experienced nausea, which continued until the nasal cavity had been entirely cleaned. He supposed he was suffering from catarrh, for which he sought and received treatment at intervals for twenty-two months, when the following additional symptoms were manifested: At intervals of three or four days he experienced attacks of vertigo, followed by severe otalgia and great tenderness of the teeth. For these symptoms he was treated by his family physician for three months, who finally advised him to consult me regarding what he supposed to be an alveolar abscess. The right side of his face was then greatly swollen. Upon examination the full number of teeth were found, but the second bicuspid had been filled, and was pulpless. My diagnosis was not that of simple alveolar abscess, but suppuration of the antrum. The extraction of the second bicuspid was followed by a slight flow of pus. A further examination showed the alveolar process greatly necrosed, but there was no visible opening into the antrum. After an application of cocaine all necrosed bone was removed, and an opening made into the antrum, when a great quantity of offensive matter escaped. The lining membrane of the antrum had thickened to at least ten times its normal thickness; this pathological condition I have found in all chronic cases upon



which I have operated. Then proceeding to syringe the sinus I failed to establish an outlet through the opening into the nares. The sinus was first cleansed with salt water, then with permanganate of potash, after which the orifice was closed in the manner already described. The patient was then directed to use Dobell's solution, by means of a nasal spray, in order to remove any secretion from the nares. The following day the pledget of straw and cotton was removed, when the discharge seemed greater than on the previous day. The opening through the meatus had then been established, and the cavity was thoroughly syringed with warm water until all traces of pus disappeared. Then it was cleansed with a stimulating solution, and the pledget renewed. This treatment was continued daily for three months, when the patient was dismissed cured. I have seen him since at intervals during the past three years, and there are no signs of recurrence of the disease.

CASE II.—Miss J., aged thirty, had considerable discharge from the right nostril and had been treated for catarrh. The right side of her face was greatly swollen. Upon the affected side were found the second and third molars, the first bicuspid, and the cuspid in a healthy condition. The first molar and second bicuspid had been extracted for alveolar abscess three years previously. The swelling of the face had appeared twice before, for which she had been treated by her family physician. On lancing, a free discharge of pus followed, and an opening was found into the antrum. After the usual treatment for five weeks, the discharge ceased, all the parts resumed their normal condition, and the opening into the antrum was allowed to close. I suppose this case was caused by one or both of the teeth previously removed for alveolar abscess.

CASE III.—Mrs. P., aged forty-five, who had been suffering for several years from intermittent fever, and had also been for some time troubled with a discharge of an offensive nature from the left nares which had been diagnosed as catarrhal, called to consult me about a first molar. Examination showed that all the teeth from the cuspid to the third molar had been removed excepting the first molar. This was badly decayed, loose, and, upon pressure, pus oozed from the socket. The tooth was extracted, disclosing a cavity into the antrum corresponding to the roots of the teeth. The extraction was followed by a copious purulent discharge. There was considerable necrosis present. After treatment for over two months without any perceptible improvement, the patient left the city for the summer, and was under treatment while absent. At the expiration of four months she returned, still without improvement. Upon a thorough examination a septum of bone about one-quarter of an inch in height was found rising from the floor of the antrum,

dividing the cavity into two parts. By means of a chisel the septum was removed and found to be of a cancellous nature. After this operation the case readily yielded to treatment and a recovery resulted.

CASE IV.—Mr. J., aged twenty-three years. In this case there was no nasal discharge, the orifice from the sinus being closed by inspissated mucus. He complained of great weight and pressure upon the affected side, severe otalgia, and deafness. The second bicuspid and the first molar were missing, leaving a large opening into the antrum. Considerable necrosed bone was removed, and the usual stimulating treatment pursued for about four weeks, when the discharge ceased and all other abnormal symptoms disappeared excepting the deafness.

CASE V.—Miss S., aged nineteen, consulted me with regard to a large swelling of the right side of her face. Before examination I supposed she was suffering from alveolar abscess, but to my astonishment, upon examination, all her teeth were found in a healthy condition. This clearly did not indicate alveolar abscess, but rather a diseased antrum. I inquired whether she had not previously received a blow upon that side of her face, or whether she had not recently contracted a severe cold. Receiving a negative reply to both questions, I made a second examination, and found that the first bicuspid was missing. She positively assured me that none of her teeth had been extracted. As the swelling pointed to the palatine as well as the facial surface, I lanced both surfaces, and was enabled to pass a probe from the facial surface into and through the floor of the antrum. She was then dismissed until the next day, when I made a careful exploration of the sinus by means of an excavator, and found in the floor of the antrum the missing tooth imbedded in the inner coat of the mucous membrane, its apex toward the alæ. After the swelling subsided the tooth was dislodged by means of a hoe excavator, then by introducing a long-pointed forceps I succeeded in removing it. After four weeks' treatment the patient was cured.

During the past eight months, in addition to the cases in his own practice, Dr. Carr has operated upon fourteen cases of diseased antrum for a throat and nose specialist. Of these cases, none resulted from chronic rhinitis, none from hypertrophic rhinitis, one from dentigerous cyst, two from polypi, and eleven from diseased teeth. This seems to clearly refute the argument of those who hold that suppuration of the antrum is generally due to causes other than diseased teeth.

#### *Discussion.*

Dr. Marshall said he had been much interested in the paper and the report of cases by Dr. Carr. The dental surgeon and the throat

and nose specialist look at these cases from different stand-points. He had seen several cases which he was confident resulted from chronic rhinitis,—one case in particular, which he had treated for six months in the manner which was recommended by Dr. Carr, and failed to cure. When the patient was examined, no evidence of any disease of the teeth could be found. All the teeth back of the first bicuspid were gone. The antrum was opened into and found to be very foul, and though the case had been under treatment for six months it was not well yet. His experience was that disease of the antrum arising from trouble in the teeth could be easily cured, but when it arose from disease of the nose it was far more difficult. When an opening is made into the antrum and there are teeth on both sides of the opening, he uses a plug formed of modelling composition, which fills the space between the teeth, and has a projection somewhat smaller than the opening, wrapped with carbolized cotton. This answers the purpose very well, and is very little trouble to make. In the course of a few days a new one a little smaller should be made so as to permit the orifice to become gradually smaller, and finally heal up altogether.

Dr. Carr asked if Dr. Marshall would not suspect necrosis in such a case as that described.

Dr. Marshall replied that in the case described he did not.

Dr. Sudduth said that in such obscure cases (chronic inflammation of the mucous membrane) it was well to inquire whether there was any tuberculous taint.

Dr. Marshall said there was not in his case.

Dr. Sudduth said Dr. Carr's statement of the excellent results in the treatment of these cases is very different from Dr. Garretson's, who, in his "Dental and Oral Surgery," says that it is exceedingly difficult to completely heal up the opening made into the antrum.

Dr. Carr said that he had not found it difficult; in fact, the openings in every case healed up completely. He had tried to find a trace of the opening in one case three years after treatment, but found it entirely healed up; even the osseous opening was entirely closed.

Dr. Atkinson said that though diseases of the antrum were frequently written about and the treatment described, we sometimes find the ambiguity of antral disease too much for us. When we know the cause of the condition, we will know how to treat it. He then described a case which was sent him by another dentist. The first molar had been extracted and an opening had been made, and treatment by various washes had been continued for some time without effect. Upon examination he found that he could get a probe only a little way into the cavity. It seemed to be full. By further examination he found that it contained a polypus. This he



snared out. Then he removed the corresponding tooth on the other side and found the same condition there. Further treatment consisted in wiping out the antrum with wisps of bibulous paper, and afterward washing thoroughly with aromatic sulphuric acid, full strength. This is somewhat painful, but is effective. Afterward some detergent preparation should be used, such as the following: oil of cinnamon, four parts; carbolic acid, four parts; and iodoform or iodol, one part. This answers well where there has been offensive matter. It is his sheet anchor in the treatment of pyorrhea alveolaris.

The hygrometric character of the cells will act so that if pure water is used to wash out the antrum the water will almost always run through into the nose. A little salt should, therefore, be added to the water, and after this peroxide of hydrogen is a good wash to clean up with.

As to the idea that an opening into the antrum made for the purpose of treating a diseased condition will not heal, he said that he knew it would heal and close up entirely. His practice in some cases was to make two openings, so that what was used to wash it out with could go into one and out of the other.

Dr. Williams spoke of creoline, and said that he should expect favorable results from its use in these cases.

Dr. Talbot. The essayist said he would extract even a sound tooth when necessary to treat the diseased antrum. I would, too, if the disease was caused by the teeth, and if the teeth were all sound the one selected would depend upon the age of the patient. In the case of a young person I would remove the second bicuspid, as the anterior teeth will move forward to fill the space. In an older person I would select the second molar. It is very easy, however, to make an opening without sacrificing a tooth; though, as the essayist said, this does not give the facility for thorough treatment that penetration by way of the alveolus does.

Dr. Brackett described a case which had been brought to him by a specialist in diseases of the nose. He said that the case would not yield to treatment. He used a fountain syringe, putting it up ten feet from the floor, and for several weeks treated the case with a salt solution, but with little resulting good. The operation was so unpleasant to the patient that it was necessary to administer nitrous oxide. The case finally went out of his hands, and was cured by a specialist in catarrhal diseases.

Dr. Carr thought perhaps the case was over-treated; that the frequent forcible washings irritated the parts.

Dr. Brackett said that the case was not treated every day, only two or three times a week.

The paper was passed.

Dr. W. W. Allport, of Chicago, Ill., read a paper upon

FACIAL NEURALGIA CONSEQUENT UPON PREGNANCY,

of which the following is an abstract :

Dr. Allport said he had never seen a definition of neuralgia that exactly suited him, nor was he able to frame one to his satisfaction. In a general way neuralgia might be defined as an acute intermittent pain occurring in irregular and often in divergent lines,—the expression of a pathological condition either contiguous to or far removed from the point of expression.

The causes of neuralgia are manifold,—sudden changes of temperature, pressure upon a nerve-trunk or its branches, from a local deposit or growth, or from arterial tension. It may also be caused by an anemic condition, a deficiency of or an impoverished condition of the blood. Anstie says, "Among the neuralgias that are the most absolutely agonizing are those which occur under circumstances of impaired nutrition incident to bodily decay."

The association of facial neuralgia with pregnancy has generally been explained as a reflex pain, caused by disturbances in the uterus or from pressure upon nerve-trunks in its immediate locality, due to the increased weight of the organ during the period of gestation. This explanation is in his judgment insufficient to account for the phenomena. It will not, he thinks, be disputed that the neuralgias of pregnancy are more frequent in the upper than in the lower extremities; whereas if the weak pressure of the uterus were the cause of the pain we should naturally expect its reference to the lower rather than the upper extremities. The fact is that it is in the face, cranium, and teeth that it is most frequently manifested. If the pain were reflex from uterine irritation, we should hardly expect this limitation of territory for its expression.

Although there are exceptions to the rule, he thinks that, while there is usually an increased volume of blood in women in the pregnant condition, the increase is in its white rather than in its red corpuscles. At the period in a woman's life when it would seem to be most important that the proportion of life-giving properties of her blood should be the richest, it generally seems to be the poorest. The superabundance of serum in her blood may make her plump and full, yet she is usually pale, evincing a lack of vitality or proper tissue-nourishment.

Another important fact is that the body below the diaphragm is in a state of venous hyperemia, while above the diaphragm it is in a state of arterial hyperemia. Arterial tension, with its muscular expansion and contraction, is a fruitful source of nerve-irritation and pain. This is doubly true when the arterial hyperemia occurs in the

mouth, where there is almost always some pathological condition present.

Then, too, it is a well-known fact that during pregnancy most women are troubled with an irritability of the nerves of the mucous membrane of the stomach; so much so that at times it is difficult for them to retain a sufficient amount of food for proper nourishment. It is much easier, as well as more rational, to conclude that facial neuralgia in pregnancy is reflected from the nerve-irritation of the stomach rather than from the uterus, for irritation of the stomach, or indigestion, is a well-known cause of this symptom. Neuralgias in the lower part of the abdomen, the inguinal regions, etc., are not uncommon in non-pregnant women. In pregnant women, however, these neuralgias are seldom experienced. If the neuralgia of pregnancy were a uterine reflex, its *locale* would naturally seem to be near to the uterus rather than distant from it, as in the prevalent facial neuralgia of this condition. In fact, the entire upper portion of the alimentary canal, including the mouth, is usually in an irritable condition, while the lower part is apt to be in a sluggish and torpid condition.

In a majority of cases the sweat-glands of pregnant women are found to be in an abnormal state of functional activity; of course the face does not escape this condition, and no one need be told that with its almost constant exposure to atmospheric influences the nerves of the face are particularly liable to those atmospheric impressions that are always productive of the molecular changes peculiar or essential to nerve-pain. Gingivitis is another source of irritation to which these subjects are peculiarly liable. Such is the nervous and vascular connection of the gums with the pericemental membrane, that the disease usually extends to the latter organ, and it not infrequently happens that the entire denture becomes not only loose, but the pressure on the teeth produces acute pain consequent upon severe inflammation in the pericemental membrane. This membrane, in every way, presents the hyperemic condition that we would expect to be productive of reflex nerve-pain. Besides this, the swollen condition of the membrane surrounding the apical foramina of the teeth so strangles the vascular and nerve supply as to seriously interfere with their functions, and must, therefore, produce irritation at the nerve peripheries. Consequent upon this, as well as from other causes, proper nourishment of the tooth-structure is cut off, and the tooth is not only rendered more liable to irritation and decay from the action of external agents, but such starved condition and retrograde metamorphosis of the nerve-fibrils of the tooth-structure is established as to be prolific of the agonizing neuralgia spoken of by Anstie, which occurs under



circumstances of impaired nutrition incident to a wasting of tissue or bodily decay.

*Discussion.*

Dr. Williams said that he had observed many cases of pyorrhea alveolaris which seemed to depend upon the condition of pregnancy; that treatment was useless while the condition continued, and that if a cure was effected the trouble would recur when the woman became pregnant again.

Dr. Atkinson said it was a mistake to consider pregnancy as a diseased condition. The troubles which accompany it are caused by bad habits of life, and the artificial conditions under which we live, especially in cities. His observation in a country practice taught him that, with the exception of a few sickly nervous women who should never have gone into the hard work of building up a new country, a woman was never healthier nor happier than when in that condition.

Paper passed.

Session adjourned at 6 P.M.

(To be continued.)

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### NEW YORK ODONTOLOGICAL SOCIETY.

THE New York Odontological Society held its regular meeting on Tuesday evening, May 21, 1889, in the parlors of the New York Academy of Medicine, No. 12 West Thirty-first street.

The president, Dr. J. Morgan Howe, in the chair.

The President. As we have two papers this evening, incidents of office practice will be dispensed with, unless there is something of special importance to be brought to the attention of the society.

Dr. Frank Abbott. I received a letter this morning from a gentleman in North Carolina, together with a short paper and a set of instruments. His paper is a description of the use of the actual cautery in the obtunding of sensitive dentine, and the instruments are like those which he uses for the purpose. The gentleman requests that the paper be presented to this society, and read whenever its executive committee shall see fit. He writes that he has obtained much benefit in reading the proceedings of the society, and thought he would like very much to do something for it, so presents this paper, which he thinks describes an excellent idea and one worthy the attention of the profession.

Dr. C. A. Woodward. I have something in the line of office practice which I think is rather unique; and as it is a case of implantation, which has been practiced by us only a few years, I am not

much in fear of older members of this society giving a similar case.

A gentleman who is one of the most prominent civil engineers in this State, and now fifty-two years old, when a lad of ten years of age had his two superior centrals knocked from his mouth while playing ball. For forty-two years he has kept those teeth very jealously. By appointment he came to me some five weeks ago, and with the assistance of Dr. Howe I replaced those same teeth in the position from which they were knocked.

I saw the gentleman this morning, and can say that the teeth are doing well, and are in a fair way to do good service for the remainder of his life. Another singular circumstance in connection with this case is that the gentleman's father, now eighty-eight years old, witnessed the accident so many years ago, and was also present at the operation a few weeks ago to see that the teeth were properly replaced and that his son returned home safely.

At the time the boy lost the teeth from his mouth his mother said, "George, save those teeth, for some day you may be able to have them put back." George was an obedient son and saved the teeth.

Dr. Bogue. Mr. President, Dr. James McManus, of Hartford, sent this picture of the Wells monument, commemorating the discovery of anesthesia, to this society, and requested me to present it in his name. I do this with great pleasure. Dr. McManus was fortunate in getting a picture which illustrated the whole case: Dr. Colton, who administered the gas; Dr. Riggs, who extracted the teeth; and Dr. Wells, who submitted to the operation. I move that the picture be accepted, and that the sincere thanks of the society be sent to Dr. McManus by the secretary.

The motion was carried.

Dr. Dwinelle. I have a subject to present to the society that will, I think, be interesting. It may be known to many present that Dr. Carroll has been making a number of experiments with the comparatively new metal, aluminium. He has made many discoveries in reference to it, and has developed qualities in it which were hitherto unknown. I remember very well when aluminium was worth fifty dollars an ounce. Now we can buy it for four or five dollars a pound, I think. Lately Dr. Carroll has made it into foil, and he has succeeded in producing a very beautiful and practical foil. I have not used it to any extent; but as aluminium is classed with the superior non-oxidable metals, it seems to me that it has a great many advantages over other cheap foils. It works with great facility, can be crimped, folded, twisted into coils or shaped into pellets, and treated like other foil; is subject to varying tempers

obtained by annealing, and has the advantage that it approaches the color of the teeth more nearly than almost any other metal we know of. We are all aware that aluminium is one of the lightest of metals. Magnesium is still lighter. Aluminium is remarkable in its other qualities. It has great elasticity. It can be tempered like steel; it can be soldered like any other metal, which has not been done heretofore, and, as you know, is capable of being cast into plates of exceeding thinness. Dr. Carroll has presented to the society a number of books of this foil, which I will lay on the table for the members to avail themselves of. With my limited experience with it, I think it is a remarkable foil, and that it will take its place in our laboratories and at our chairs in conjunction with all the other materials which we use in our daily practice. I could enlarge upon this subject, and some time may do so, but this evening, as our time is limited, I content myself with simply introducing it to your consideration.

Dr. H. C. Meriam. Some years ago one of my patients at the university spoke to me of the knowledge to be gained of different professions and trades by the study of their catalogues. I have been collecting for some years, and have now one of the largest collections of trade and professional catalogues possessed by any private individual. I have recently obtained what may be called a model professional catalogue. It is from Teimann & Co., surgical instrument makers, New York City. In every case the descriptions of the instruments are given by quotations from some medical authority, or in the language of some physician or surgeon who presented them at the society meetings or through journals, and in no case is a description by an instrument-maker given precedence over that of the professional man introducing the instrument. The publishers have, at my request, sent a copy of the catalogue to the library of the Harvard Dental School, and one to the Massachusetts Dental Society, and they have also sent one to be presented to this society. I take pleasure in presenting it to you in their name. I see that they have sent with it some advertisements giving the terms on which they furnish it to the profession. Being human, I suppose they wish to advertise a little.

I have brought with me some programmes of the coming meeting of the Massachusetts Dental Society, and I would like to present them, so that all those who desire copies may secure them.

On motion of Dr. Cook, the catalogue presented by Tiemann & Co. through Dr. Meriam was received, with the thanks of the society.

The President. If there is nothing else of importance to be brought to the attention of the society, I will have the pleasure of introducing Dr. W. H. Potter, of Boston, who will read a paper entitled "The Function of the Dental Society."



Dr. Potter. Mr. President, and gentlemen of the New York Odontological Society: Having had much to do with the management of a society in another city, certain convictions with regard to the duties of a society have been forced upon my mind, and these convictions I have undertaken to set forth in the paper which I have the honor of reading before you to-night.\*

The President. Gentlemen, the subject of Dr. Potter's paper is before you for discussion for a limited time.

Dr. Dwinelle. Although our time is limited, it seems to me that we ought to say something when so many good ideas, so ably expressed, have been given us. I approve of the whole paper.

The President. I am sure we are very much obliged to Dr. Potter for his thoughtful and ably-written paper. If you gentlemen wish to say nothing further than a universal amen, we will take up the next subject of the evening.

Dr. Dwinelle. I move you, Mr. President, that the thanks of the society be given to Dr. Potter for his able paper, and with it the expression that it is thoroughly indorsed by this society at large.

Dr. Dwinelle's motion was carried.

The President. I need not introduce the next speaker to you, gentlemen, but I shall have the pleasure of calling upon Dr. Bogue to address us upon the subject he has selected.

Dr. Bogue here read a paper entitled "A Study of the Visible Changes that take place during the Development of Human Teeth and their Alveoli," illustrated with a number of drawings.†

The President. Gentlemen, the subject of Dr. Bogue's paper is before you for discussion. And let me say that all present are invited to take part in the discussion, whether members of the society or not. We have some gentlemen here from abroad, some from our own city who are not members of the society, and some associate members from other cities. We should be pleased to hear from any of them on this subject.

Dr. Abbott. Mr. President, with the limited time this evening, I think justice could not be done to the subject, it being now past ten o'clock. Therefore I move you that the discussion be postponed until the next meeting, and that one hour be then devoted to the subject of Dr. Bogue's paper.

Dr. Abbott's motion prevailed, and it was so ordered.

Dr. Dwinelle. Mr. President, I think we should at least express to Dr. Bogue our thanks for presenting such an interesting paper,

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\* Dr. Potter's paper will be found at page 616 of this number.—ED. DENTAL COSMOS.

† Dr. Bogue's paper will be found at page 581 of this number.—ED. DENTAL COSMOS.

one so very artistically illustrated. In respect to its illustrations, we have never had anything to approach it before. I am especially pleased that he has brought the sixth-year molar into prominence, showing that that much-abused tooth has a very important function to subserve in the dental economy. It is like the fixed star, around which the other stars and the planets revolve. Some of our Solons, whom we respect for their good intentions, say it has no right in the jaw at any time; but I am glad to see that its function is becoming more recognized.

Dr. Meriam. There is one important point touched upon in Dr. Bogue's paper regarding the loss of temporary teeth, and referring also to the absorption of the dental pulp. I will report a case of interest in this connection.

One morning a lady appeared in my office with a baby between two and three years old, who had fallen from a chair and knocked out one of the front teeth. The mother had taken up the child, and while the nurse held its hands she immediately replaced the tooth. In her agitation she put it in wrong side before, then removed it and placed it in its position correctly. I applied no ligatures, and advised her to let it alone. She took turns with the nurse in holding the child's hands for a few days, so that the tooth should not be disturbed. I requested her to allow me to see the child occasionally, so that I might keep a record of the case, which she could easily do, as their summer residence was near by. She did so, and for some years would occasionally bring in the child. One day she came in and gave me both the front teeth. The tooth which had been knocked out had remained in the mouth a fortnight longer than the other. There was no noticeable difference in the teeth, except that one was a shade darker than the other. There was no difference in the absorption. That had, as far as I could see, gone on alike in both teeth. I have the teeth now. It was a case of heroic treatment, and by a heroine. One of two conclusions we must accept: either that the pulp reunited, or that the absorption took place in the devitalized tooth exactly as in the other.

Dr. Lord. It occurs to me that it is a most wise arrangement to postpone the discussion of this paper. Not infrequently very valuable papers, that have required a great deal of thought, investigation, and time in their preparation, have passed almost unnoticed for want of time to discuss them. This paper of Dr. Bogue's is the result of years of thought and observation, no doubt. It brings to our attention very forcibly the importance and value of saving all the teeth if possible, and, if we cannot save all the crowns, to at least save the remnants and roots. How very interesting and valuable it will be if as many as possible of those who take an in-

terest in this subject will come prepared to make remarks and give their opinions on this important subject based upon their observation and experience.

Dr. Perry. Mr. President, it seems to me that a whole evening should be given to this paper, and then it would be too little. If the paper means anything, it means that we should not tinker too much with the teeth. Dr. Bogue is a very close observer, as we all know, and he has told a story here in these pictures, and given us a lesson in his paper, that we could all study with advantage.

Dr. C. D. Cook. Mr. President, I move a vote of thanks to Dr. Bogue for the great care and attention he has given to this paper for our benefit, and with the hope that the discussion of the paper will be as interesting and instructive as the paper itself has been.

Dr. Cook's motion prevailed.

Dr. Carroll. I wish to say a word in regard to the foil that has been placed before the society to-night. The question has been asked how it should be worked. I will simply say that it should be rolled and annealed as though it were gold foil, except that it should not be annealed at such a high temperature. It melts at 1300° F. It should be manipulated in the same manner as non-cohesive gold. It is non-cohesive, hence non-galvanic, or non-magnetic. That it is non-magnetic may be proven by placing a magnet over it.

Dr. Bogue. Mr. President, I do not suppose I shall have the pleasure of being with you at the next meeting of the society, and while I regret very much that these drawings cannot be discussed to-night, I am grateful that even one or two questions have been asked. If the gentlemen are interested in such questions, they can imagine the feelings one has in a museum containing skulls and comparative anatomical specimens of all sorts, where these questions answer themselves. I have thought that the idea which I meant to put some little emphasis upon to-night—that upon the arch of the six lower front teeth depends to a great degree the regularity of all the teeth in the mouth—is not a hackneyed idea. The idea came from the museum of comparative anatomy first; but as I looked back upon a good many dozen, I do not know but some hundreds, of cases of regulating which I have had, many of which I have casts of, I find that those cases in which that law was observed, however ignorantly, have been generally successful cases, and those cases in which that law has been violated have not been satisfactory. That this result is invariable I do not pretend to say, for other irregularities arise among the back teeth; but those are far less frequent. There are certain irregularities which can be successfully attended to in a few days or weeks, if taken in early childhood, while if they are neglected at the proper time months or years will hardly suffice



to correct them. The idea that these cases should be taken in hand at once is emphatically correct. A classification of such cases would, it seems to me, be of immense value, for there are other cases that should not be touched before thirteen or fourteen years of age. I hope to see members of this society join in that sort of research which Dr. Howe has so ably argued for.

Adjourned.

S. E. DAVENPORT, D.D.S., M.D.S.,  
*Editor New York Odontological Society.*

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### EASTERN ONTARIO DENTAL ASSOCIATION.

THE tenth annual meeting of the Eastern Ontario Dental Association was held in Cornwall on the 18th and 19th of June, 1889.

Over twenty of the most prominent dentists of Eastern Ontario were present, all of whom took an active part in the convention, which augurs well for its future prosperity.

The following officers were elected for the ensuing year: J. C. Lidden, president; J. C. Bower, vice-president; John Robertson, secretary and treasurer.

Interesting papers were read by Messrs. Martin, Mansell, and Hanna.

Instructive and well-executed clinics were given by Messrs. Bower, Davidson, Weagant, and Clint.

The next meeting was appointed to be held at Ottawa, in June, 1890.

J. ROBERTSON, D.D.S., *Secretary*, Ottawa.

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### NEW HAMPSHIRE DENTAL SOCIETY.

THE thirteenth annual meeting of the New Hampshire Dental Society was held in Concord, June 18 and 19, 1889.

The following were elected officers for the ensuing year: G. C. Duncan, president; W. R. Blackstone, vice-president; E. B. Davis, secretary; G. A. Young, treasurer; G. A. Bowers, librarian; C. W. Clement, E. G. Cummings, and F. H. Brown, censors; J. H. French, B. C. Russell, and E. C. Blaisdell, executive council.

The next annual meeting is to be held in Concord the third Tuesday in June, 1890.

EDWARD B. DAVIS, *Secretary*,  
Concord, N. H.

## NORTH CAROLINA STATE DENTAL ASSOCIATION.

THE meeting of the North Carolina State Dental Association at Greensboro, N. C., June 25 to 27, was perhaps the most notable dental meeting ever held in North Carolina.

More than half the time of the sessions was devoted to clinics by Drs. E. C. Kirk, of Philadelphia, C. L. Alexander, of Charlotte, C. A. Rominger, of Reidsville, J. E. Wyche, of Oxford, S. P. Hilliard, of Rocky Mount, J. E. Mathews, of Wilmington, J. W. Griffith, of Greensboro, F. S. Harris, of Henderson, N. C., E. T. Starr, of Philadelphia, and others.

Among the papers read was a very practical one on "Mechanical Dentistry," by Dr. C. J. Watkins, and one on "Dental Quackery," by Dr. J. H. Durham, who among other true things says of the quack: "He side-tracks his conscience, and, trusting to the vain show of immodest presumption rather than to the more reasonable certainties of practical efficiency, starts upon a tour of unpardonable imposition upon an innocent public." . . . "If there is one point settled in the practice of dentistry more decidedly than any other, it is that operations of a high grade of excellence cannot be done in a short time, without patience, without ability, with cheap materials, and in a poorly-equipped office." . . . "This reminds us that houses of this class (fourth-rate dental depots) are responsible for no inconsiderable amount of ignorant and designing quackery. They will manufacture a cheap article which they know to be worthless and totally unreliable in its manipulation, and advertise it extensively as one possessing all the merits and virtues of one manufactured and offered for sale by a house of known reputation for its trustworthiness in the manufacture of its goods."

With general satisfaction over the results of the meeting, the society adjourned to meet in Wilmington, N. C., next year.

## NEW JERSEY STATE DENTAL SOCIETY.

THE nineteenth annual meeting of the New Jersey State Dental Society was held at Asbury Park July 17 to 19, and was remarkable for the large attendance, the number of interesting papers, and the many participants in the discussions of the papers. Mere mention of the names of the essayists, their subjects, their discussants, and the briefest possible digest of what was read and said in those relations would fill many pages of the present number, in which we have space for but an allusion.

The clinics and exhibits were attractive and well attended. The Dental Protective Association was commended, and subscriptions solicited.

The board of examiners indorsed the action of the national board of examiners in relation to the Maryland University Dental Department, and sustained the subsequent course of the national secretary. A resolution was passed refusing recognition to the International Dental Congress of Paris, and disapproving of the suggested successive or return congress in this country, for the reason that a legitimate international dental congress should be called by associative authority and consist of delegates from dental societies in the various countries.

The officers for the ensuing year are: S. C. G. Watkins, president; George E. Adams, vice-president; Chas. E. Meeker, secretary; G. Carlton Brown, treasurer; C. F. Holbrook, B. F. Luckey, Oscar Adelberg, and C. S. Stockton, executive committee.

#### NATIONAL ASSOCIATION OF DENTAL FACULTIES.

THE National Association of Dental Faculties will meet in annual session at Saratoga, N. Y., on Monday, August 5, 1889, at 10 o'clock A.M. In August, 1888, this association ordered that thereafter delegates should be required to present duly executed credentials. Delegates are urged to report early on the date specified.

A. O. HUNT, *President*.

#### ASSOCIATION OF NATURALISTS AND PHYSICIANS OF HEIDELBERG.

THE sixty-second meeting of the Association of German Naturalists and Physicians (Naturforscher und Aerzte) of Heidelberg will be held at Heidelberg, Germany, September 17 to 23, 1889.

Notice is hereby given that at the last meeting of this association arrangements were made for the organization of a dental section.

MARCUSE, *Secretary*,  
Hauptstrasse 113<sup>a</sup>, Heidelberg.

#### UNION SEMI-ANNUAL MEETING OF THE FIFTH, SIXTH, SEVENTH, AND EIGHTH DISTRICT DENTAL SOCIETIES OF THE STATE OF NEW YORK.

THE Fifth, Sixth, Seventh, and Eighth District Dental Societies of the State of New York will hold a union semi-annual meeting October 24 and 25, 1889, at Stanfield Hall, Elmira, N. Y.

A large attendance is promised, and it is expected that the meeting will prove of more than ordinary interest. A more extended notice will be given in the October COSMOS.

MYRON D. JEWELL, *Sec'y Sixth Dist.*,  
Richfield Springs, N. Y.



## UNION MEETING AT SPRINGFIELD, MASS.

THE Connecticut Valley Dental Society, New England Dental Society, and Connecticut State Dental Society will unite in a union meeting at Springfield, Mass., October 23, 24, and 25, 1889.

The programme will consist of lectures, essays, clinics, and dental technics. Special arrangements will be made for viewing the clinics. A cordial invitation is extended to members of dental societies.

GEO. A. MAXFIELD, D.D.S., *Sec'y Joint Committee*,  
Holyoke, Mass.

## CENTRAL ILLINOIS DENTAL SOCIETY.

THE eighth annual meeting of the Central Illinois Dental Society will be held in Peoria on Tuesday and Wednesday, October 8 and 9, 1889. Members are requested to come to the city on Monday afternoon, as the "organization" and all preliminary business will be transacted on Monday night. Tuesday and Wednesday will be devoted entirely to practical every-day dentistry.

W. A. JOHNSTON, *Sec'y*, Peoria, Ill.

## DENTAL COLLEGE COMMENCEMENTS.

## UNIVERSITY OF MICHIGAN—DENTAL DEPARTMENT.

THE Dental Department of the University of Michigan held its annual commencement, in connection with the other departments of the university, at Ann Arbor, Michigan, on Thursday, June 27, 1889.

The commencement oration was delivered by the Hon. J. L. M. Curry, LL.D.

The number of matriculates for the session was one hundred and eight.

The degree of D.D.S. was conferred on the following graduates in the Dental Department:

NAME.	STATE OR COUNTRY.	NAME.	STATE OR COUNTRY.
Albert E. Anderson.....	England.	Oscar Cahn Kerlin .....	Ohio.
Robert Burns Avery.....	Pennsylvania.	Reuben John Kirk .....	Ohio.
Harry Fielden Briggs.....	England.	Chas. Shuter McIndoe...	Wisconsin.
Frank S. Buckley, A. B. ....	Michigan.	Edward Cook Mills.....	Ohio.
Chas. Sumner Buttolph....	Michigan.	Frank E. Morey. ....	Michigan.
Geo. Benton Chester.....	Indiana.	Chas. Franklin Noyes ..	Michigan.
Geo. Edward Courtney...	Michigan.	Arthur Mowry Potter...	Michigan.
Harry G. Dunaven.....	Michigan.	J. S. Rice, M. D., D. D. S.	Indiana.
Louis Phillips Hall.....	Michigan.	Arthur Richardson.....	Canada.
Frank D. Harding.....	New York.	Sumner Oliver Sawyer...	Ohio.
Geo. Byron Hayes, A. B. ....	New York.	Henry H. Schuhmann...	Illinois.
Clarence E. Henderson...	Michigan.	DeWitt Spalsburg .....	Michigan.
Wm. Carley Herbert.....	Michigan.	Carroll Wesley Staples...	Vermont.
Geo. Arthur Holliday.....	Michigan.	Griffith Pritchard Terry...	Italy.
Horace N. Holmes.....	California.	Frank Prescott Watson...	Massachusetts.
Edy Randall Johnson.....	Ohio.	Joe Welch.....	Michigan.
Jacob Wm. Jungman.....	Ohio.	John H. Williams .....	Ohio.

## HARVARD UNIVERSITY—DENTAL DEPARTMENT.

THE annual commencement of the Dental Department of Harvard University was held, in connection with the commencements of the other departments of that institution, at Cambridge, Mass., June 26, 1889.

The number of matriculates for the session was forty.

The degree of D.M.D. (*dentariæ medicinæ doctor*) was conferred on the following graduates by Charles William Eliot, LL.D., president of the university:

NAME.	STATE OR COUNTRY.	NAME.	STATE OR COUNTRY.
Fred. Anthony Arnold...	Rhode Island.	William Lombardino.....	Germany.
Henry Jefkins Borton...	Massachusetts.	Patrick Wm. Moriarty..	Massachusetts.
Charles Poor Briggs.....	Massachusetts.	Wm. Curran O'Leary ...	Massachusetts.
Wm. Frederick Gay .....	Massachusetts.	Arthur H. Osgood, A.B..	Massachusetts.
Paul Grunewald.....	Germany.	Caleb Heath Shepard.....	Maine.
Frank Irving Hammond.	Rhode Island.	Fred. Ewing Twitchell...	Massachusetts.
Fred. S. Hopkins .....	Massachusetts.	Eugene Jacob Weitzel ...	Switzerland.
Daniel Albin Jones.....	Connecticut.	J. Robert White.....	Massachusetts.
Wm. Russell Jones.....	Massachusetts.		

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EDITORIAL.

## THE ANNUAL MEETINGS.

THE twenty-ninth annual meeting of the American Dental Association will be held at Saratoga Springs, N. Y., commencing at 10 o'clock A.M. on Tuesday, August 6. Rates to Saratoga and return, one and one-third full fare. The ordinary ticket going should be bought at the starting-point, taking the agent's receipt therefor, which, when countersigned by the secretary of the association, will entitle the holder to return on the reduced rate.

The Southern Dental Association will hold its fifteenth annual meeting at Galveston, Texas, beginning Tuesday, August 20.

The Texas State Dental Association will meet at the same time and place.

Dr. W. S. Carruthers, chairman of the Committee of Arrangements of the Southern Association, furnishes the following information: The Mallory line of steamships, averaging a 3000 tonnage, offers the unprecedented low rate of \$65.00 for the round trip, or \$35.00 one way (including state-rooms and meals), up to September 1. A steamer sails from New York Saturday, August 10, at 3 P.M., the day after the adjournment of the American Dental Association, and is due at Galveston August 17, stopping only at Key West.

The Beach Hotel (said to be the equal in situation and appointments to the Hygeia Hotel at Old Point Comfort), and the Tremont

Hotel (at which the clinics will be held and the dental exhibits made), both offer reduced rates during the sessions of the association.

Dr. Carruthers writes eloquently of the hospitalities to be expected from the citizens of Galveston, of the healthful sea-breezes, of tropical vegetation, of miles of the finest beach on earth, of unsurpassed bathing facilities, of royal fishing, and other attractions.

Railroad rates: Full fare going, and one-third fare returning to those holding certificates (which must be obtained at the time of purchasing the ticket), to be subsequently countersigned by Dr. D. R. Stubblefield, corresponding secretary of the association.

### AN INTERNATIONAL DENTAL CONGRESS.

We give the prominence of the editorial department to the following correspondence and report because of the importance of the subject discussed, and because, therefore, of the urgent necessity that definite opinions and conclusions shall be reached concerning it, lest the old-time prediction concerning "a house divided against itself" be verified in the history of the dental profession:

CHICAGO, July 9, 1889.

TO THE EDITOR OF THE DENTAL COSMOS:

Sir,—The inclosed correspondence, which explains itself, shows that a very considerable part of the dental profession in Chicago are quite unanimously and strongly opposed to the holding of an International Dental Congress in this city in 1892. To correct any impression to the contrary which may have been spread abroad, it is desired that the action taken by the Chicago Dental Club be placed before the profession.

Yours truly,

C. STODDARD SMITH.

CHICAGO, June 6, 1889.

DR. C. STODDARD SMITH, *Secretary Chicago Dental Club*:

Sir,—At the last meeting of the Chicago Dental Society the following resolutions were adopted:

"In view of the probability that the next International Dental Congress will be held in the United States, and the fact that this city is a suitable place for its meeting;

"*Resolved*, That the Chicago Dental Society, relying upon the co-operation of the other dental societies and the members of the profession in this city and State, do respectfully and cordially invite the holding of the next International Dental Congress in the city of Chicago, in the year 1892, and we can assure the members of the profession throughout the world that they will receive a generous and hospitable welcome."

The secretary was instructed to send a copy of these resolutions to each of the other societies in the city, and invite their co-operation in the matter. It is suggested that each society appoint a committee of one to confer with a like committee from the Chicago Dental Society, and they together to present the matter to the coming congress in Paris.

Respectfully, etc.,

C. N. JOHNSON, *Sec. pro tem.*



CHICAGO, June 28, 1889.

DR. A. E. BALDWIN, *Secretary Chicago Dental Society*:

Sir,—I have to acknowledge receipt of a communication dated June 6, 1889, signed C. N. Johnson, Secretary *pro tem.* of the Chicago Dental Society, relating to the appointment of a joint committee to confer in regard to inviting the holding of an International Dental Congress in this city in 1892.

This communication was brought before the Chicago Dental Club at its regular meeting held June 27, and, after full discussion of the subject and the suggestions contained in the letter, it was unanimously voted that the secretary be instructed to communicate with the Chicago Dental Society, and to notify them that at the time of the present meeting the club, as such, feels that it is undesirable to take such action as requested.

Very respectfully,

C. STODDARD SMITH, *Secretary.*

LONDON, N. W., May 30, 1889.

TO THE EDITOR OF THE DENTAL COSMOS:

Sir,—The question is being asked here, as well as in America, "Shall international dental congresses continue to be held?" The sentiment among the best dentists here, as far as I can learn, is that the Paris meeting will be well enough if carried out as proposed by the late Dr. Brasseur in his admirable letter,—that the so-called International Dental Congress should begin and end with the Paris meeting. But I find that the feeling is strong here that the well-meaning French brethren are being used by some of their American brothers for another and a more far-reaching purpose than they think. And that is none other than to perpetuate the so-called International Dental Congress, by adjourning to meet again in three years, thus antagonizing the dental section of the International Medical Congress, which is already assured of an organization at Berlin next year. To substantiate this statement you have but to read the statement made in an editorial in the May number of the *Dental Review*, of Chicago, wherein the editor gently removes the mask. It really provokes a smile to see the *Review* enlarge upon the magnanimous waiting for the Washington meeting to have passed before insisting upon an International Dental Congress, and how it gave warm support as a journal and personally to the meeting at Washington. To one who has been a close reader and even a warm friend of the *Review* the above statement caused surprise.

From what I can learn, the effort will be made to have it appear at the Paris meeting that the Americans are anxious to have the congress adjourn from Paris to meet in Chicago in 1892, although the practical impossibility of successfully maintaining and properly supporting both the International Dental Congress and a dental section in the International Medical Congress must be apparent. If our meetings were to occur every six years, one or the other would fail of a proper support.

As to which of these two organizations is the best to support, looking to our own and the world's good, it would seem to me to be the one that will draw us nearer to the medical ranks, because the mutual education of the general and the special practitioner is thus greatly assisted, and the public is far more influenced by properly educated general practitioners than by us. It would be foolish to reject the proffered hand that the medical profession in America—and in fact the world over—is to-day holding out to us.

I feel assured that the Paris brethren can do no act more just and in keeping with their professed purposes in calling and holding this meeting than by indorsing the Berlin meeting of 1890, and at the close of the session in Paris in September of this year adjourning without date.

A. E. BALDWIN, M.D., D.D.S.

## DR. JENKINS, OF SOUTH AMERICA.

THE following note from Dr. Geo. H. Hayden will explain itself, and we publish it as the simplest way of correcting the error in regard to the decease of Dr. Jenkins:

Boston, July 5, 1889.

TO THE EDITOR OF THE DENTAL COSMOS:

*Sir*,—Your notice of the death of Dr. John S. Jenkins, of Lima, Peru, S. A., furnished by Dr. Elliott, of London, Eng., was rather premature, and the doctor on opening the *Cosmos* was much surprised to find himself "down among the dead men" without his knowing it. Some of his friends were also humorously indignant with him that they were not invited to the funeral.

I have had the pleasure of Dr. Jenkins's friendship since his arrival in Lima, in 1852, at which time I was in practice in that city. Dr. Elliott pays a just compliment to his character as an honorable, upright gentleman and skillful practitioner. He stands at the head of his profession in Peru, and has just completed his seventieth year. I bade him good-bye in Lima on the 12th of June last, he being in vigorous health, and apparently likely to put in another decade of hard work.

Respectfully yours,

GEO. H. HAYDEN, of Santiago de Chile.

## ORTHODONTIA.

A NEW work on "Orthodontia," by Dr. S. H. Guilford, is now in press, and will be ready for delivery September 1. It will contain about one hundred and seventy-five pages, with one hundred and fifty illustrations. Advance sheets justify the prediction that the book will be a valuable addition to dental literature.

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On Alveolo-Dental Periostitis, and more especially on the Chronic Form of that Affection, its Pathology and Treatment. By Silvio Mela. Thesis presented to the Dental School of Geneva for the degree of surgeon dentist. Geneva: Rivera & Dubois, 1888. [Translated title.]

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## OBITUARY.

## DR. J. W. SMITH.

DIED, at Cañon City, Colorado, June 6, 1889, of consumption, J. W. SMITH, D.M.D., in the thirty-fifth year of his age.

Dr. Smith was born in New Hampshire, and began his studies in dentistry in Newport, R. I., in the office of Dr. C. A. Brackett, with whom he was afterwards associated. He graduated with high standing from the dental department of Harvard University in 1879. Modest, capable, and obliging, he soon developed a very busy practice and made many warm friends. He was an earnest student of everything relating to dentistry, and he made quite a number of inventions for facilitating the dentist's work. His conscientiousness and faithfulness in the discharge of every duty were extreme, and led to such overwork as laid the foundation for fatal disease. In the disappointment of high hopes for continued usefulness and through long months of discouraging illness he never murmured, but gave his mind still to bring as little trouble and as much help to others as his strength would permit. Those whom he served will long cherish the memory of his earnest life.

## DR. LEON RIDEOUT.

DIED, at Lynn, Mass., May 14, 1889, LEON RIDEOUT, D.D.S., in the thirty-ninth year of his age.

Dr. Rideout was born at Rowley, Mass., November 5, 1849. He went to Lynn when but seventeen years old, and studied dentistry for seven years under the tutelage of Dr. A. C. Blethen, after which he commenced what resulted in an extensive and lucrative practice at that place. He graduated at the Boston Dental College in 1876.

Dr. Rideout was a member of the Massachusetts and New England Dental Societies, the former of which passed resolutions of respect to his memory, noted in our July issue. In his death the profession has lost an earnest and proficient member, whose sterling qualities of heart and mind endeared him to all who knew him. He leaves a widow and two children.

## MRS. HORACE WELLS.

THE death of Mrs. ELIZABETH WELLS, widow of Dr. Horace Wells, the discoverer of anesthesia, occurred at her home in Hartford, Conn., on the morning of July 17, 1889. Mrs. Wells was in her seventy-first year. It was more than forty-one years ago that her husband discovered the anesthetic property of nitrous-oxide gas.



## PERISCOPE.

**BACKWARD DISLOCATION OF THE LOWER JAW.**—In our issue for February 16, on page 194, we published an account, by Dr. Henry C. Coe, of a case in which he had diagnosticated subluxation of the lower jaw backward with displacement of the interarticular fibro-cartilage. Dr. Coe's patient was a lady of a nervous temperament, and, at a meeting of the New York Clinical Society, at which he gave the history of the case, he expressed the opinion that it was "due to a peculiar laxity of the ligaments, especially the capsular ligament, and associated with a spasm of the muscles, of purely nervous origin." The displacement was recurrent, usually coming on during sleep and being associated by the patient with unusual physical or mental strain during the previous day.

From anatomical considerations, some hesitation has generally been felt about recognizing the possibility of such a dislocation, but there may be reason for a revision of current opinion on this point. Reference is made in the *Gazette hebdomadaire de médecine et de chirurgie* for March 22 to an exposition of the subject in German, founded upon four personal observations by Thiem during the past two years, together with a report of a case furnished by a colleague. The patients were all elderly women. Gaping caused the injury in three instances, while in another a too energetic use of the tongue-depressor resulted in a backward displacement when the maxillæ met. The author cites Guérin's reports concerning congenital backward dislocations, and that of R. W. Smith, in which dissection showed a very imperfect development of all the components of the joint on the affected side, including bones, interarticular cartilage, ligaments, and muscles. The usual signs of luxation are absent in the class of defects mentioned by Smith; but facial symmetry is wanting and there is a marked deformity of the features, the face sinking in on the affected side, while it is rotund on the other. In spite of Crocker King's observation, in 1855, true backward dislocation is often overlooked, says the author.

Anatomically, he thinks, the possibility of this dislocation is beyond question. The condyle may slip into a temporary receptacle that is bounded in front by the tympanic tubercle, behind by the mastoid process, and internally by the styloid process. This "tympanico-stylo-mastoid fossa" (*fosse tympanico-stylo-mastôïdienne*) is extremely small in men, but in women it is said to be capacious. The maxillary angle, varying in degree with age, is also a factor in this form of dislocation, being hardly appreciable in young children and in the aged, and the alveolar dental arch being scarcely, if at all, developed. Thus the masseter and internal pterygoid muscles are levators only, having no power of forward traction, while the temporal muscle tends to draw the bone backward. Hence the rarity of the ordinary forward dislocation among children and old persons. This backward dislocation occurs in the act of closing the mouth, the lower jaw coming in contact with the upper and being forced slightly backward, the condyle resting exactly in front of the mastoid process. Reduction is effected by opening the mouth suddenly.

Sir Astley Cooper looked upon the victims of subluxation as young

persons of a feeble and relaxed muscular system, and of little constitutional stamina. Noisy movements of the temporo-maxillary articulation are also a symptom of insufficient tone, indicating that quinine, iron, strychnine, good food, cold bathing, electricity, and open-air life are in order. Agnew calls attention to the fact that the vice of subluxation and noisy movements may degenerate into spontaneous luxation, in which one or both condyles slip out of the glenoid cavity in the most unexpected manner. Sometimes, in addition to the general tonic treatment, it is necessary to protect the jaw by a sling about the chin, fastened by tapes over the head.

It will be perceived that the superior capacity of the "tympanico-stylo-mastoid fossa" in women renders equanimity of temper and gentle speech in them a precautionary measure as well as an esthetic and ethical duty.—*New York Medical Journal*.

**ANTISEPTIC MOUTH-WASH.**—Galippe and Malassez give, in *Nouveaux Remèdes*, No. 55, the following formula for an antiseptic mouth-wash which has been found satisfactory by them :

Alcohol,	parts	370 ;
Carbolic acid,	"	10 ;
Thymol,	"	5 ;
Oil of peppermint,	"	15 ;
Tincture of anise,	"	100.

This may be colored with some tincture of cochineal, and employed morning and evening, and the mouth rinsed out at the same time with a weak solution of boric acid.—*Med. and Surg. Reporter*.

## HINTS AND QUERIES.

TO THE EDITOR OF THE DENTAL COSMOS :

Sir,—In the April (1889) number of the DENTAL COSMOS, at page 298, in an abstract of a paper read by me at Syracuse, before the Union Convention of the Fifth, Sixth, Seventh, and Eighth District Dental Societies of the State of New York, appeared the following sentence : "A knowledge of the laws of chemical action directs the prescription of compounds which when taken into the stomach break up into those which have the exact properties desired. Thus, to get the medicinal effects of sulphuric acid he would administer resorcin, which would be decomposed, forming that acid." Now, it should have been *sulphonic acid*, and not sulphuric. My chemical and physiological researches prove that resorcin is converted into *sulphonic acid* when taken into the system and eliminated in the urine, and is therefore easily detected. Attention to this error will oblige yours, etc.—GEORGE ARCHBOLD, M.D., New York, N. Y. (late of Phoenix, N. Y.)

**CADMIUM PERNICIOUS IN AN ALLOY FOR AMALGAM.**—I see by the July number of the DENTAL COSMOS, page 572, that Mr. Hutchinson believes that in some rare instances the use of amalgam as a filling-material causes ulceration as well as sore lips, gums, and cheeks. It seems that he claims to have no knowledge of the chemical composition of the stoppings referred to, but on removing them found that the ulcers rapidly disappeared. I hope he will not discontinue the use of alloys altogether, but investigate further for better results. In the years of 1874 and 1875 I was perplexed in the same manner, and I found, by consulting my records, that in nearly every case I was compelled to believe that it was due to the use of alloys containing cadmium. At that time I lost a great many pulps and treated many ulcerated teeth containing these fillings, and I believe cadmium was the sole cause of my trouble.—FRED. H. FALES, D.D.S., Waterville, Me.

# A MONTHLY BIBLIOGRAPHY OF DENTAL LITERATURE.

COMPILED BY J. MELVIN LAMB, M.D., WASHINGTON, D. C.

THIS bibliography will be continued monthly in the DENTAL COSMOS, and will furnish as complete a record of dental literature as can be gleaned from current periodicals and transactions of societies.

The abbreviations of titles used are those common to bibliographical work, and will, it is presumed, be readily comprehended by any one familiar with dental or scientific publications. Any explanation will be gladly furnished by the compiler.

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No. 9.

## ORIGINAL COMMUNICATIONS.

### PRIMITIVE AND MODERN LIVING MATTER.

BY T. DWIGHT INGERSOLL, ERIE, PA.

A CONCEPTION of living matter imprisoned in the enamel of a human tooth would seem to require a flight of imagination across regions of known facts to the utmost confines of thought. It is a new by-way of mind too narrow apparently for travel except by those who can trace a line, threading all kinds of life downward in rank, structure, and function to the first forms of living matter where scientific investigation comes to an end.

The region outside of natural facts is a dangerous one; but was it not through a series of imaginary visits to that realm that Science, Poetry, and Religion were stimulated to rise to the present degree of attainments? Besides, looking into infinite space beyond the verge of positive knowledge, was it not through a protracted investigation of life phenomena in general, and a microscopic examination of living matter in dentine, that life in enamel was conceived to be possible? It is only within the present century that a microscopic lump of protoplasm has been called a living being with any degree of propriety. Though it be without a mouth or any other organ, and entirely destitute of structure, it has some of the attributes of life,—mobility, irritability, and spontaneity of action; it grows by absorbing nutriment and propagates by self-division. Its home is on an exceedingly narrow border-land of life between the organic and inorganic worlds, and while its physical elements belong to the physical universe of matter, its life phenomena must be classed with that of all living beings.

Having gained a little knowledge of the nature and attending phenomena of our own existence, and looking away from ourselves down the descending plane of animal life, we find that the living matter in those animals that are lower in rank and more simple in

structure is essentially the same as that in the dentine of a human tooth. Looking still farther down at the very foot of the declivity, nothing is found but a transparent fluid of living matter. It is life in a primitive state, "the physical basis of life," the starting-point in the existence of every animal and every plant. It seems to be entirely without form or structure, and destitute of the least sign of life, and yet under the microscope it is seen to respond to irritation and is apparently spontaneous in movement.

Professor G. J. Allman, ex-president of the British Association, in his address before that body called attention to this primitive state of living matter.

"While we watch it beneath the microscope," he says, "movements are set up in it: waves traverse its surface, or it may seem to flow away in streams, either broad, and attaining but a slight distance from the main mass, or else stretching away far from their source, as narrow liquid threads, which may continue simple, or may divide into branches, each following its own independent course; or the streams may flow into one another, as streamlets flow into rivulets and rivulets into rivers, and this not only where gravity would carry them, but in a direction diametrically opposed to gravitation: now we see it spreading itself out on all sides into a thin liquid stratum, and again drawing itself together within the narrow limits which had at first confined it, and all this without any obvious impulse from without which would send the ripples over its surface or set the streams flowing from its margin. Though it is certain that all these phenomena are in response to some stimulus exerted on it by the outer world, they are such as we never meet with in a simply physical fluid: they are spontaneous movements resulting from its proper irritability, from its essential constitution of living matter."

Under suitable conditions it assumes form and sometimes almost imprisons itself in a membranous or calcareous covering. Sir William Dawson, LL.D., F.R.S., has discovered recently in the Laurentian limestone of Canada masses of fossils traversed by microscopic cylindrical apartments which were once filled with marine living matter. Similar specimens have been discovered by the writer in the limestone of Lake Erie (though the formation is of a later period), having tubules about the diameter of a horse-hair. He has also in his collection reticulated fossil corals from the same lake which are tray-like in form and lace-like in structure. This kind of living matter animates every animal and every plant. It gives form and structure to the bones and the teeth. Every particle seems to be a microscopic living being, all divided into groups for the building up of the various organs, every cell having its allotted



place in the formation of the different parts, every organ being built by a group of cells which is independent of every other group, and still all combined harmoniously for the completion of the entire organism. There seems to be a potency in the germ of every animal and every plant which gives direction to the process of differentiation, so that the grouping of the cells takes place in such a manner that the organs are formed according to the type of the species to which the germ belongs.

Life-cells are not conscious beings, nor are they very intelligent; and it would not be very strange if a certain group did imperfect work or strayed away from typical forms and created a "freak." Imperfections do sometimes occur in the dental organs: there may be a deficiency of nutriment, or the group may pass into a state of "suspended animation" and the tooth never appear.

The living matter in some plants falls sometimes into a state of inactivity. The spores of myxomicetæ, as well as the sclerotium, after completing the life-cycle of development, pass into a state of rest. In this condition it is said they may remain for many months "without the least sign of life." Life is not extinct, however, for, when the dried, horny sclerotium is dropped in water, manifestations of life become in a short time visible.

On the supposition that animal and plant life are identical (which is not denied) it would seem that if one or more microscopic masses of living matter were inclosed in the substance of enamel and communication with the parent matter be nearly cut off it might die, or it might pass into the dormant state like the living matter in a kernel of frozen wheat, or like spores of micro-organisms in cakes of ice, or like the microscopic red-snow plant, which laughs at the death-like cold of the arctic regions, graphically described by an accomplished naturalist. "The red-snow plant," he says, "to which are mainly due the beautiful phenomena by which tracts of arctic and alpine snow become tinged with a delicate crimson, is a microscopic organism whose whole body consists of a simple spherical cell. In the protoplasm of this little cell must reside all the essential attributes of life: it must grow by the reception of nutriment; it must repeat by multiplication that form which it has itself inherited from its parent; it must be able to respond to stimulus of the physical conditions by which it is surrounded. And there it is, with its structure almost on the bounds of extremest simplification, taking its allotted part in the economy of nature, combining into living matter the lifeless elements which lie around it, redeeming from sterility the regions of never-thawing ice and peopling with its countless millions the wastes of the snow-land."

Living matter seems to be subject to arbitrary limitations and to

a variable environment, so that it may not always be able to arrange in form such elements as are necessary for a perfect tooth. Its intentions, if it has any, are doubtless in favor of the greatest perfection; but vitality, so-called, is limited in action, every organism being limited in growth, comparative perfection, and time of life. Limitations of this character exist doubtless on account of the superiority in some respects of the physical forces over the life forces. This must be so, as life did not appear till a long time after the first forms of solid matter, and at a time when only the simplest beings in form and structure were possible. The first crude states of the earth were not in a suitable condition for life of greater complexity, and the rocks had been undergoing transformation after transformation tens of thousands of years before the animals of the greatest complexity could find support on its surface. The superiority of the physical forces may also be inferred from the fact that every kind of life is dependent, directly or indirectly, on them for existence; and no other forces have been known to support in a similar manner either plants or animals.

It was formerly supposed by the writer that there were two kinds or classes of force in nature,—the physical forces and the so-called life forces; and as every living thing has been obliged to maintain a constant struggle for existence, finally dying in misery and being consumed by the physical forces, its substance reverting back to inorganic matter, there appeared to be an antagonism between the physical and the so-called life forces; but on looking at the subject from various stand-points he believes now that the numerous facts connected with it will not justify the conclusion that any antagonism does really exist. Nature is not a "house divided against itself,"—building up constantly myriads of organisms and tearing them down for recreation or "for some wise purpose."

A better idea of life may be had which is more in accordance with the uniform operations of nature. Between organic and inorganic nature there is doubtless harmony of action, the former being dependent on the latter for the continuance of life on the earth; or, if the common physical elements—water, warmth, food, etc.—had been cut off, every living thing would have ceased to exist. Physical nature not only permits a plant to arise from the ground, but fosters its upward growth against gravity, one of its own most powerful forces. She permits the formation of soft deciduous teeth, but does not favor their retention to adult age. She permits the eruption of the permanent teeth, the growth of the body, and allows an indefinite number of years of existence; the number of years, however, depending on the inability of the organism to sustain itself any longer under the effects of an untoward environment, when the com-

ponent parts fall into the arms of the physical forces whence they came.

This kind of dependence is not one of slavery. Life was introduced by some unknown power at a time when previous conditions of the world had changed or had passed away, so that first life was barely possible without interference with the forces then in action. There was probably no antagonism because there was no interference. The law of constant change continued, and transformation of physical elements favored progress of life toward a higher plane till it grew into a state of intelligence and conscious mind. Man's consciousness, however, is not infallible, as it is generally supposed to be. He may feel that he is conscious of seeing living matter in tooth-enamel, or he may likewise at some future time be conscious that what he had previously seen in enamel was not living matter.

It may now be seen that the states and conditions in which living matter may be found have a very wide range. The primitive matter in man, plants, and animals will endure a range of temperature of more than two hundred degrees of Fahrenheit's thermometer. It is found alive a few degrees above the boiling-point of water, and from that point it exists in every degree of temperature to several degrees below the freezing-point. A simple vital cell or a mass of fluid protoplasm is an easy state of existence. It feels nothing but irritation part of the time, and but little of that; but when a colony of such cells are built into a brain in connection with an organism of the greatest complexity, there will arise sensation and thought and consciousness. A greater mystery, perhaps, is that it cannot be ascertained whether any particle in the primitive state will, under the most favorable conditions for growth and differentiation, develop into a tiny insect or into the largest whale.

From the fact that the existence of living matter in enamel is denied by some in the profession who are perhaps possessed of excellent powers of observation, it may be well to inquire if there is any possibility of its existence. Enamel is found in contact with a group of tooth-cells and shaped by them, as it were, the inner surface not being polished like that of the external, but studded, geode-like, with microscopic points pricking the membrane whose cell-pointed surface fits exactly into the concavity of the enamel-head as the thin, filmy, radiating leaves of the body of a coral polyp extend into and exactly fill the spaces between the thin radiating partitions of hardened lime-salts which the coral animal has constructed outside its own body. If, now, enamel is being formed according to physiological law, we may expect that it will be made into a perfect canopy or hood for the dentine without leaving a fiber of living matter shut up in the enamel; but if there



arise in the system an interference to healthy action, formative processes may not proceed normally, and a particle of living matter may become surrounded and partially or wholly imprisoned in the molecules of enamel,—lime-salts. In that case it may or may not die. It may continue indefinitely in a dormant state, like the germ in a grain of frozen wheat, or it may die and its grave be found by some dentist as a defective point in enamel.

In regard to the question of existence or of non-existence, it makes but little difference whether life be considered as a simple cell or as a reticulated fabric or in a semi-fluid state. Could it be proved to exist in enamel, the wonder would be but little greater than it was to those who first discovered it in dentine. Life being a unit wherever found, and still myriad-like in its differentiations, it is a great mystery; but a greater mystery is the origin of first life on the earth. The earliest and best account of any vital action is written in the first-transformed rocks. Geology points to the swaddling-clothes of first life, the cradle, its youthful days, and its successful career of improvement on improvement till its culmination in conscious mind in man; and still nothing is positively known of its origin.

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### A CASE OF GIANT-CELL SARCOMA.

BY ALBERT WESTLAKE, JR., D.D.S., ELIZABETH, N. J.

NOVEMBER 11, 1887, Sarah S., age nine years, called, complaining of severe pain in the region of the first and second left superior deciduous molars. Noting considerable inflammation, and that the crowns were completely decayed, the roots were extracted. After carefully washing the parts, the patient was dismissed with instructions to keep the mouth cleansed.

On the 1st of December following, she called during my absence. A small epulis had presented itself over the parts whence the root had been extracted. My father, with whom I was associated, was desirous that I should examine the case, and requested the patient to call on the following day. She failed to keep the appointment, and we did not see her until the 1st of February following. In the mean time her mother informed us that "there was a large purple tumor full of holes and the blood oozing out constantly." By this time the appearance was like that shown in Fig. 1.

Concluding that in so young a subject the case would excite considerable interest, I took the child to a clinic by Professor Weisse, at the New York College of Dentistry. He diagnosed the tumor as a giant-cell sarcoma, and advised its immediate removal. She was placed in the hands of the consulting surgeon of the college, Dr. Charles McBurney, and entered at St. Luke's Hospital. On February

27, Dr. McBurney removed the growth successfully. By making an incision through the median line of the lip and then around the ala of the nose and a short distance upwards, and by stretching the integument, sufficient space was secured for internal dissection,

FIG. 1.



which precaution prevented a noticeable scar on the face. The portion of superior maxilla excised, including the tumor, was five centimeters in length by two and one-half vertically and two in thickness.

The pathological report shows that the tumor was vertically

FIG. 2.



about two and one-half centimeters thick. One of the oral teeth, the left superior cuspid, was almost completely surrounded by tumor-tissue, and the bicuspid and molar crowded back and outward. A fragment of the floor of the antrum of Highmore, one centimeter in diameter and deprived of its mucous lining, was found on the upper aspect of the fragment of jaw removed. Microscopically the

tumor was composed of spindle and oral cells of medium size, with a very large number of giant-cells. There was a minimum amount of stroma, and the vascular supply was very abundant.

Fig. 2 represents the aspect of the mouth fifteen months after the operation. There is no indication of a return of the disease. The child complains occasionally of the stoppage of the nares before arising in the morning, and of slight bleeding through the nares. She presents a healthy appearance. She uses dilute Listerine as a mouth- and nasal wash, and is improving rapidly under this treatment. To prevent regurgitation and the nasal sound in articulation I have closed the aperture, as shown in Fig. 2, by a black rubber plate weighing fifty grains, accurately fitted to all the parts and clasped to the remaining teeth.

It is Dr. McBurney's intention to close this aperture in the course of a year by a lap taken from the inner surface of the cheek, after which a plate can be adjusted with teeth attached.

The mother of the child had lost all the superior teeth from pyorrhea alveolaris, with the exception of the roots of two centrals and a cuspid, which I extracted last fall. Considerable hemorrhage followed, and soon after the gum became swollen. I prescribed Listerine as a mouth-wash, and in two months the parts were in normal condition.

During the winter I extracted an inferior sixth-year molar for her son, who proved to be of a hemorrhagic diathesis.

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## SPUR PLATES FOR REGULATING TEETH.

BY J. N. FARRAR, M D., D.D.S., NEW YORK CITY.

(Extract from an Illustrated Lecture before the Brooklyn Dental Society, April 22, 1889.)

To move outward to line partially erupted instanding upper cuspids, laterals, and bicuspid has been regarded by many dentists to be very difficult, if not actually impossible, and therefore such cases have often been abandoned, because the teeth never sufficiently erupt to enable the operator to get a firm hold on them. In correcting these instanding upper teeth I have found no such difficulty—in fact, none at all—since I began to use platinum wire splice anchored to plates and to clamp-bands, or a piece of plate soldered to proper anchors and dipping down between the instanding teeth and the gum.

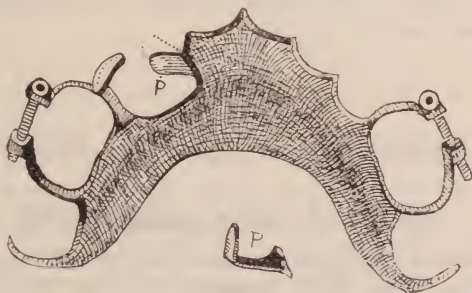
Several of the devices I have, long ago, published in the *DENTAL Cosmos*, but probably the most efficient class of mechanisms that would be thought superior has yet to be made public.



Some of them I will here draw upon the blackboard; taking, first, the case of an instanding upper cuspid. (See Fig. 1.)

Vulcanized into and projecting from the palatine surface of the hard-rubber roof-plate, having a clamp-band on each side for anchoring to some of the side teeth (here represented to be the bicuspids), is a piece of gold plate, P, about one-eighth of an inch wide. This extends beneath the gum's surface and bears upon the lingual side of the neck of the cuspid. To give a strong anchorage to this piece of gold plate, it is bent at a right angle, as shown in the lower part

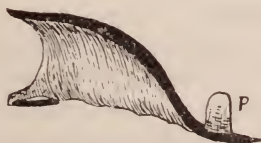
FIG. 1. SPUR PLATE.



of the diagram. Thus a foot is shaped which becomes imbedded in a considerable portion of the substance of the roof-plate.

To operate this device and maintain pressure upon the tooth, this spur is bent more and more every two or three days. When it has been bent so far as to lessen or lose its utility, it is taken off, and its original form set forward and vulcanized to the plate. Then the process is renewed and steadily progresses until the cuspid has been

FIG. 2. SECTION OF SPUR PLATE.



forced, outward, into place. Usually, and for esthetic reasons, I temporarily close the interdental space with an artificial tooth, as here shown.

Instead of using clamp-bands for anchors to the roof-plate, simple ferrules will sometimes prove sufficiently firm attachments. This form of plate I now illustrate in section. (See Fig. 2.)

Upon the same principle I occasionally make roof-plates for widening the dental arch. For such cases flat spurs, made like the one shown for moving the instanding upper cuspid, are vulcanized into the edge of the roof-plate and then so arranged as to rest against

the lingual side of each tooth that is to be forced outward to proper line.

These spurs need rebending every two or three days until the arch has been sufficiently widened. In the roof-plate class of widening apparatus I regard this as the best that I have yet devised.

The character of the force obtained from these devices is intermittent.

I have devised a similar apparatus for moving the teeth of such cases by continued force, but do not, however, regard it as equal to the above. This is accomplished by interposing a spiral spring between the spur and the roof-plate. The spur is soldered to the spring, which is vulcanized into the plate.

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## PROCEEDINGS OF DENTAL SOCIETIES.

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### AMERICAN DENTAL ASSOCIATION.

THE American Dental Association held its twenty-ninth annual meeting in the Town Hall, Saratoga Springs, N. Y., commencing Tuesday, August 6, 1889, at 11 A.M. There was a large attendance of members.

#### FIRST DAY—*Morning Session.*

The association was called to order at 11 A.M. by the president, Dr. Charles R. Butler, Cleveland, O. The proceedings were opened with prayer by Rev. Dr. Harper, of Philadelphia.

The session was devoted to routine business, among which were the reception and reference of the reports of the Publication Committee and of the treasurer.

Amendments to the constitution providing that permanent members of the association losing through any cause membership in their local societies should thereby cease to be members of this association, and for the reinstatement by unanimous vote of permanent members whose membership had lapsed, were, after discussion, indefinitely postponed.

The resignations of Drs. C. F. W. Bödecker and Wm. Carr, of New York, and J. H. Martindale, of Minneapolis, were received and accepted.

The president read his annual address, Dr. Atkinson occupying the chair. The address was mainly of a reminiscent character, alluding feelingly to the death of several members since the last meeting. Referred to the Publication Committee.

Dr. McKellops called for the reading of the resolutions adopted at

Boston, discountenancing the public indorsement by college professors of remedies or preparations for the treatment of the teeth, and then called attention to a circular distributed through the hall bearing the names of a number of prominent professional men.

Several of the gentlemen named, who were present, disclaimed any knowledge of the use that had been made of their names and expressed their indignation at the occurrence.

Adjourned to 8 o'clock P.M.

### *Evening Session.*

The association was called to order at 8.25 P.M., President Butler in the chair.

On motion of Dr. McKellops, the courtesies of the floor were extended to Prof. H. H. Mudd, of St. Louis, and Dr. J. Ward Hall, of Shanghai, China.

Section IV, Histology and Microscopy, was called, and Dr. Frank Abbott, its chairman, reported that there had been nothing of importance done in histology during the year. Of course men have been at work constantly, but what they have accomplished is not yet ready to be presented to the world. The Section would present a paper on the "Growth of Enamel" by its chairman, and an elaborate lantern exhibit of slides by Dr. Sudduth, delineating the development of the hard tissues.

Dr. Abbott read his paper,\* prefacing the reading with an expression of thanks to Prof. Carl Heitzmann for assistance in the preparation of the paper and the drawings with which it was illustrated.

Dr. W. Xavier Sudduth, Philadelphia, thought it wise, as the lantern exhibit of photo-micrographs, which would show exactly the points discussed, would be largely on the same subject as the paper, to defer his remarks until that time.

Dr. W. H. Atkinson, New York, wished to express his satisfaction with the exhibit to-night and to emphasize his disagreement with the idea that anyone can see all there is in a specimen from a photograph, which is only on a plane, and that the photograph is better than a drawing. Anyone who has had experience in microscopy knows that there are many things in a specimen not necessary to show in studying a single point, and it is the province of the draughtsman to show only that which is essential. That it is advantageous to have a photo-micrograph when it is desirable for all to see he would admit, but that belongs rather to experts than to novices. If there were more study of the kind done in Carl Heitzmann's laboratory, where we look and study and quiz one another to get at the

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\* This paper, with the illustrations, will appear in a future issue of the DENTAL COSMOS.



different interpretations, we should be better qualified to judge of what is shown. As the years go by he sees that more and more the desire to bolster up certain views is dying out, and the desire to find the truth is growing among students of nature's mysteries.

Dr. Sudduth. With regard to the comparative value of drawings and photo-micrographs, at the lantern exhibit there will be shown single cells where the magnification is 1250 diameters, in which the lines are as sharply drawn as they can be carved.

On motion of Dr. Horton, the subject was passed until the lantern exhibit should be made.

Dr. J. Ward Hall, Shanghai, China, by request, spoke of the practice of dentistry in the East, in China and Japan especially. He wished at the outset to disabuse the minds of his audience of the idea that there is a wide field for the practice of dentistry in the countries named. It is almost wholly confined to the members of the European colonies located there. So far as practice among the natives is concerned, even in Japan, not much progress has been made. The Japanese well understand the nature of metals, and so far as the mere application of a metal to a tooth, as in filling a cavity, is concerned, they can do the work as well as any man. But they know no chemistry, no anatomy, nothing as yet of the nature of the structures of the teeth. Our terms and treatment they try to apply, but they have a very indistinct idea of what it is all for. Of the Chinaman it may be said that he knows no dentistry at all. He carves teeth and ties them in, and he may in cases of severe toothache extract worms, but that is about the extent of his attainments.

There are, however, men engaged in practice in these countries who are well known in America, men who practice their profession thoroughly, and who do about as good work as is done at home. There are nine American dentists on the coast of China, but he is not certain that there is a single one permanently located in Japan. In all India there is not one truly American dentist; not that the circumstances prohibit his presence, but because the man has not yet been found who could face the difficulties of the climate, etc. Egypt has its American dentists, and the profession there needs no criticism. As to the opportunities for practicing in the far East, he is inclined to say to the young men that a man who with industry, talent, and ambition cannot succeed in a country like this will find a poor field for his ability in a foreign land. For himself he cannot help regretting that he left his native home.

Dr. W. H. Morgan, Nashville, Tenn., said that the M. E. Church South has established a hospital at Tokio in connection with its missionary work, and Vanderbilt University dental department has

been invited to select from its classes and send over a young man competent to practice dentistry to take a position in the hospital and also to practice. He wished to state that the American Medical Association will hold its next meeting at Nashville in May, 1890, and he extended a cordial invitation to those present to attend the Dental and Oral Surgery section of that body.

Dr. Hall wished to add a word about the status of dentists in England and India. Under the law in Great Britain, the diplomas of only two colleges in the United States are accepted without question. Graduates of other colleges who wish to practice there must do so behind the name of some other man or must have been in practice at the time the act went into effect. When that act was passed, it was thought to be an advance; but there is now considerable trouble brewing over it in London, though the difficulty of procuring the repeal of the act is great. As to the social status of the dentist in England and India, it is well known that the English are a club-loving people, and the character of a man is determined to some extent by the clubs in which he holds membership. There is not in all India a dentist, nor does he believe there is one in England, who is a member of a first-class club, or who enjoys the social relations that a professional man should be entitled to. The cause is that his profession is looked upon with disfavor.

On motion of Dr. Crouse, to-morrow evening was set apart for a lantern exhibit of slides illustrating Sections IV and VII, and 11 o'clock in the morning for hearing the attorney of the Dental Protective Association.

Adjourned to 9 A.M. to-morrow.

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The annual election was held Friday morning.

Excelsior Springs (near Kansas City, Mo.) was selected as the place for the next meeting.

The following officers were elected for the ensuing year: M. Whilldin Foster, president; A. W. Harlan, first vice-president; J. D. Patterson, second vice-president; Geo. H. Cushing, recording secretary; Fred. A. Levy, corresponding secretary; A. H. Fuller, treasurer. Executive committee, J. N. Crouse, L. D. Shepard, A. O. Hunt, G. W. McElhaney, F. Abbott, E. T. Darby, S. H. Guilford, S. G. Perry, W. W. Walker. Publication committee (*appointed*), Geo. H. Cushing, W. C. Barrett, J. S. Marshall. Local committee of arrangements (*appointed*), J. D. Patterson, John W. Meng, C. B. Hewitt.

(To be continued.)

## NEW YORK ODONTOLOGICAL SOCIETY.

THE New York Odontological Society held its regular meeting on Tuesday evening, June 18, 1889, in the parlors of the New York Academy of Medicine, No. 12 West Thirty-first street.

The president, Dr. J. Morgan Howe, in the chair.

The following communication was read by the secretary :

DR. C. F. IVES, Corresponding Secretary of the New York Odontological Society, New York City :

*Dear Doctor*,—At a meeting of the Harvard Odontological Society, held at Young's Hotel, Boston, October 25, 1888, the following vote was passed :

That, for the purpose of aiding those members of the profession who wish to do original work in the requirements of dental practice, introduce new appliances or instruments, bring to the notice of the profession those who make or deal in anything of use or that can be made of use, and for the purpose of bringing to the attention of the makers for scientific and educational institutions the numbers of such appliances that can be used by the dental profession ;

*Resolved*, That a committee be appointed to collect addresses of such dentists, dealers, workmen, etc., and incorporate them into a directory, which shall also contain some description of the articles kept and of original work done.

At a subsequent meeting it was voted that the secretary be instructed to correspond with other dental societies, requesting their co-operation. In accordance with the above, will you assist us in making a directory which will be of great value to the profession throughout the country ?

Interests of every kind find their appropriate center in your city, and it will be of great value to the profession if such a list is published.

Dr. W. E. Page, Studio Building, Boston, Mass., was appointed chairman of committee, and will receive and put on record any information coming under the above motion. A copy of the preliminary directory is sent herewith, which will give an outline of the work proposed.

Will you kindly present the above to your society, so that it can go on its records and be published in your proceedings, and thus bring the matter before the whole profession ?

(Signed)

WM. H. POTTER,

Recording Secretary Harvard Odontological Society,

254 Warren street, Boston.

On motion, the communication was accepted and referred to the Council with power.

The following communication was then read by the secretary :

NO. 257 ESSEX ST., SALEM, MASS., June 14, 1889.

DR. J. MORGAN HOWE, New York City :

*Dear Doctor*,—I send you two files for presentation at the next meeting of the Odontological Society. They are the first two of a set that I am having made, and I send them as the full set will not be done in season for your next meeting.

These are intended for use in finishing approximal fillings near the margin of the gum. They are safe-back that they may not chafe the gum or rubber-dam, and safe-side that they may not injure the adjoining tooth or filling. They are curved so as not to strike the roof of the mouth, and so tempered as not to break easily, and they can be made thinner by grinding on the safe side if need be. I



have had them made so that we can honestly claim that they are a professional instrument, and they can be ordered through any instrument-maker who wishes to aid the profession. At the Massachusetts meeting all were sold that were made, but more will soon be ready.

Yours very truly,

HORATIO C. MERIAM.

Dr. Littig moved that the communication be accepted, and that the thanks of the society be returned to Dr. Meriam for the presentation made. Motion carried.

The President. At the last meeting of this society it was ordered by vote that one hour of the time this evening should be devoted to the discussion of Dr. Bogue's paper. We are to have a paper from Dr. Brockway, and another from Dr. Holt, of Goldsboro', N. C.; therefore, if there is nothing special to present, we will pass over Incidents of Office Practice.

The President called Vice-President Woodward to the chair.

The Chairman. The discussion of Dr. Bogue's paper will now be in order, gentlemen.

#### *Discussion.*

Dr. J. Morgan Howe. Mr. President, I take pleasure in expressing my appreciation of the fine pictures and of the enthusiasm which has prompted Dr. Bogue to present his subject so elaborately.

It is in advocacy of a good cause, and one in which I would assist; but if I understand the drift of the argument, I could hardly go as far as Dr. Bogue seems to in opposition to the practice of extracting teeth. I believe there are conditions when the sacrifice of teeth is demanded, and he does not seem to admit that; but we are agreed, I think, in believing that the practice is far too common. In advocating his views, however, he makes some rather surprising statements, which, if they are as unwarranted as I take them to be, would seem to be calculated to produce an impression the reverse of what he intended; and it is better, perhaps, that defects in the argument should be pointed out by one who is favorably disposed toward the author's intentions in presenting his views. We are quite ready to admit as "well-known anatomical facts" the statements that the jaw continues to grow from infancy to adult age; that its growth is mostly posterior to the second temporary molar, and that the growth of the alveolus is dependent on that of the permanent teeth; but I confess myself astonished at the assertion that "*the growth of the jaw depends largely on the growth of the permanent teeth.*" This statement is emphasized later, after the description of the position of the developing teeth in the maxillæ of a child of five and a half or six years, in the statement that "if these four first permanent molars were to be extracted the development of the jaw would be interfered

with by just that degree of width ;” and again in the same connection he says, “if the second molars should be extracted, the third molars, without forcing the jaw to make room for them,” . . . etc.; and again, on Fig. 10, he says the effects of extracting the four first permanent molars would be “the development of the jaw would be interfered with by just that degree.” I am willing to plead ignorance of the truth of these statements, and as for the former being a “well-known anatomical fact,” I am prompted to ask how it became known and where it is recorded? If I were to indulge in assertion, I would be inclined to say that the jaws develop conformably to their type, quite independent of, and often of a very different type from, the teeth which grow upon them. Thus we have large jaws and small teeth, on the one hand, and small jaws and large crowded teeth on the other. I question the alleged fact that the development of the jaws is dependent on the growth of the teeth in any such sense as that the absence of the *force* of dental development will interfere with it. On what basis does such an assertion rest?

Then on the subject of shortening or elongation of the bite I think some of Dr. Bogue’s statements are far from correct, and his generalizations without any adequate basis. It may be remembered that in connection with a paper I had the honor of reading before this society a year ago,—to which Dr. Bogue has referred,—in order to show that some statements made by Dr. I. B. Davenport on the subject of the shortening of the bite after the extraction of teeth were not so broadly applicable as he had concluded, I showed models of two cases from which the first molars had been removed without any shortening of the bite resulting. Models of the previous as well as the existing condition were shown, the lapse of time in one case being eleven years, and in the other fourteen, and in the latter there had been an actual elongation of the bite. I called special attention to this lengthening of the bite (Fig. 5 of my paper) in the essay itself, and again in the discussion I “*challenged*” a close inspection of the models. In the paper I referred to it as a “physiological elongation of the bite,” said I believed I had seen it in other cases, and had not seen it before recorded. To all this Dr. Bogue replied, “Dr. Howe is quite right in saying that in neither of the cases shown in Figs. 5 and 6 was there any perceptible shortening of the bite, yet I believe there was an actual shortening,” etc. He made no reference whatever to the elongation. Now see how Dr. Bogue has progressed in a year! He has meantime discovered the jaws of a deceased Hollander which confirm the fact which I vainly tried to have either admitted or denied, and now the elongation of the bite is apparently ancient history. The matter is treated all the way through his

paper as a matter of course, and the picture of the Hollander's jaws, with the deciduous molar left below by the rising up of the permanent teeth, is shown, not to confirm the possibilities of development demonstrated in my models, but "to show how much the bite is lengthened from childhood to adult age." Commenting on Fig. 7, he says, "Until the permanent molars shall have developed and lengthened the bite;" and on Fig. 8, without showing the previous condition of the same denture, he says, "It will be noticed that the molars and bicuspid have so elongated, or, in other words, there has been a lengthening of the bite." And in recapitulating the facts and alleged facts he says "the bite has lengthened normally," without showing that such has been the case by comparison with the previous condition of the same denture, but assuming that it is always so because it has been shown to have taken place in two cases. It seems to me that all this generalization and jumping at conclusions on such meager evidence is unwarranted, and is certainly unscientific. There has been no evidence to prove that the lengthening of the bite—as demonstrated in two cases—is universal, or is even a rule of development, much less that the Hollander's jaws exhibit the degree of elongation that takes place. Dr. Bogue's Fig. 11, it seems to me, should have been sufficient to cause hesitation in announcing such a proposition as if it were an established fact, for if the bite of this woman had elongated in any such degree as the Hollander's the points of her lower incisors could hardly now be in contact with her upper gums, even if we were to admit the truth of the assertion that "the bite is shortened to the extent here seen."

To show that such elongation of the bite as I was able to demonstrate, and as is demonstrated by Dr. Bogue's case (Fig. 10), cannot be assumed to be universal, I am able, through the kindness of Dr. Littig, to show you this model of the denture of a young woman twenty-two years old, who has in the lower jaw two deciduous molars which are on the same level with the permanent teeth next them. It seems evident that we shall require further information before concluding that elongated bites are either the rule or the exception, and, if the rule, to form an idea as to the frequency of exceptions.

In the paper I presented to this society, previously referred to, I showed models of four cases in which, after the removal of the first permanent molars, the teeth anterior to such extractions had moved considerably backward. This result was desirable and favorable in two cases, and not so in the other two. The *previous conditions* were shown by models, as well as the present conditions, in three of these cases. I will not consume your time by quoting what I said



then, but allow me to quote from Dr. Bogue. On the movement of teeth to fill the vacancy caused by such extractions, he says, "This movement of the teeth together is a movement from behind forward almost invariably. Whenever a movement from before backward takes place, it is comparatively slight. But the whole row of teeth, or a part of it, may drop inward toward the tongue, narrowing the arch, as Dr. Howe has correctly described." Then further on he says, "Dr. Howe speaks of the tendency of the six anterior teeth to a retrograde movement after the extraction of first molars. While the models already shown do not confirm any such tendency, the illustrations I here present exhibit a tendency quite opposite." I showed you the models for the purpose of allowing my statements to be corrected, and I have brought them here to-night again in order to show the truth. In each case the teeth anterior to the extractions have moved backward. The two cases which show the unsightly spaces between the anterior teeth are samples of like results from mistaken extractions of bicuspid or molars such as you have all seen, I am sure. I ask you to examine these models that were used to illustrate my paper of last year (Figs. 5, 6, and 7), and correct me if I do not state the fact when I say that each one is a demonstration of a retrograde movement of the teeth anterior to the extractions. Then examine these two models of a case not previously shown (numbered 9). Four first molars were extracted April, 1878, girl aged thirteen. The models show conditions existing immediately before extractions: the six anterior superior teeth slanting forward, considerably crowded, laterals and cuspids lapping; the six anterior inferior teeth crowded, cuspids prominent. Then compare these conditions with models of the same mouth made in November, 1888. Notice how much more perpendicular the superior teeth are, how much less the laterals and cuspids lap the teeth anterior to them, and how much more regular the lower front teeth are, and how much less prominent are the lower cuspids. No regulating appliances were used in any of these cases, and the changes that have occurred must have been the result of a *tendency* backward that was operative in these cases. I have not claimed that such retrograde movement is universal, but I ask any one present to correct me if what I have said about these cases is incorrect. Dr. Brackett's cases showed the same results, for crowded front teeth cannot be made less irregular by an inward movement. Such movement would be on the line of the radii of the arch, and would be a change toward less space, not greater. Is it not clear that to get space for more regularity of crowded front teeth, or for spaces between teeth, the anterior teeth must move backward after such extractions and not inward? I am not quite clear as to what is intended by the

statement that "the whole row of teeth may drop inward toward the tongue, narrowing the arch," but when to this is added, "as Dr. Howe has correctly described," I am quite amazed, for I have never described, so far as I know, any such movement either correctly or incorrectly. The suggestion of what teeth *may* do caused me to measure the width of these four dentures before and after extraction, and I have brought the dividers with me so that my statements may be either verified or contradicted. Comparing the distance across, between bicuspid and between molars, you will find in each of these cases that in no instance is the distance less in the present than in the original condition, and some of the measurements across are greater after extractions than before. Here we have a demonstration of what has occurred in these cases, so far as the suggestion of dropping inward toward the tongue is concerned, although it is quite possible that in some other cases the results would have been different.

Dr. Bogue's Fig. 18 does not seem to be a demonstration of natural tendency in the movement of teeth, because appliances were used. The statement that the appliance was made by "adapting a plate to the roof of the mouth, avoiding, *as far as I could*, any pressure upon the molar teeth," is not very definite. The bar which passed around the front of the six upper front teeth could hardly be conceived to exert force against them through the screws with which it was attached to the plate, unless that plate was held back by attachment somewhere excepting the roof of the mouth. And if the pressure was exerted on all of the six front teeth at once, the resistance of such an arch may have been greater than that of any attachment that could have been found for it, unless it was the back of the head. However that may have actually been, there seems to have been an improvement, so that presumably the lady could close her lips, and yet it is said "we cannot see that the six upper front teeth have gone backward." To what the improvement is due we can hardly tell, but as an illustration of the changes that occur without interference it does not seem as if this case could be accepted as typical. The case represented by Fig. 20, where the twelfth-year molars have been lost, is claimed to show "interference with proper development" and a "shortening of the bite," but we are not shown the previous condition of the same denture. With no proof of this kind, the spaces on both sides of the cuspids, and between the laterals and centrals, and "no tight contact anywhere among the upper teeth" need not necessarily be attributed to a change produced by extractions. Such conditions do exist where no teeth have been lost. But if we admit that there has been a change, and that the spaces were produced by the extractions, as stated, then the change

is another instance of the retrograde movement of teeth anterior to extractions, the tendency to which Dr. Bogue denies!

In these particulars, and in others also, Dr. Bogue's assertions and arguments do not seem to me to be well founded, and I call attention to them, not to excuse the practice of indiscriminate extractions, but rather to assist in making valid objections to such practices more impressive.

Dr. Littig. The diagram of the mouth of the Hollander as exhibited by Dr. Bogue only shows one thing,—that is, the length of the bite in that given case. In the mouth of which I took an impression for Dr. Howe there are a number of temporary teeth; the laterals are temporary, besides two or three of the molars, and the bite of those teeth seems to be even with the permanent teeth, all on a line; so that I cannot give Dr. Bogue the credit of finding out that even as a general rule the bite is lengthened. As to the development of the jaw being dependent upon the growth of the teeth or the building up of the alveolar ridge, there are in Boston two brothers well known in that city who have never had any teeth. One of them I have seen, and from all external appearances I do not see but they have as well-developed jaws as most gentlemen have. I call to mind another fact, and that is the wonderful success in surgery by the late Prof. James R. Wood, wherein he removed the inferior maxillary, carefully preserving the periosteum, and getting thereby a reproduction of the jaw-bone. Subsequently, after the man's death, Prof. Wood removed the second jaw-bone and had them both in his museum. In the second or reproduced jaw there were no teeth at all. Certainly in that case the development of the jaw was not dependent upon the teeth. So I think the theory advanced by Dr. Bogue is not warranted by the facts.

Dr. Howe. Anyone who will take the trouble to measure carefully with the dividers, which I have passed around, the distance across the arches, comparing the previous with the present condition, will notice the fact which I have stated, that there has been no contraction of the arch in any single case after these extractions.

Dr. S. E. Davenport. I would like to call the attention of the gentlemen who are examining the models that have just been passed around to a result in one case not referred to by Dr. Howe, but which is very noticeable. I have forgotten how those particular models are numbered, but there are two pairs of them together. The sixth-year molars were extracted, and the result has not been, in two respects certainly, beneficial. I did not study the models sufficiently to find out the probable reason for the extraction, and perhaps I would not be able to determine that from the models; but I did notice that not only is the bite considerably shortened by



the extraction of those molars, but the almost perfect antagonism of the teeth, as shown by the first model, is exchanged for a lamentable "hit or miss" occlusion which can only *chop* the food. A little later, when I get the models again, I will speak further in regard to them.

Dr. Howe. Probably that is the case in which I stated the results were unfavorable.

Dr. Davenport. Possibly. I think they are.

Dr. Brockway. What was the object of the extraction in this case?

Dr. Howe. If it is the case I suppose it is, in which I said the results were unfavorable, I stated in my paper I had taken them out with no definite idea, but I was infected with the theory that it was a good thing to take such teeth out. I exhibit it as an illustration of bad results produced by the retrograde tendency of the anterior teeth, the tendency which Dr. Bogue says is not confirmed by these very cases. I stated that in my paper of last year, and again to-night, by saying that in two cases the results were favorable and desirable, and in two cases they were not so. But in all of them the teeth anterior to the extractions have moved backward.

Dr. Davenport. I am exceedingly sorry that the discussion, as brought out by Dr. Howe to-night, takes so much of a turn towards the sixth-year molar question, because not only are Dr. Howe's remarks very well put, and his criticism very pertinent, but he is careful to prove his steps as well as the models of a few selected cases can as he proceeds. Unfortunately, as it seems to me, some of the good results in these few cases have been so connected with the extraction of the sixth-year molar that, although, as I said a moment ago, the extraction of those teeth even in these cases has proved to be the reverse of beneficial in some respects, marked attention is called to that very hazardous and uncertain method of correcting irregularities, and there is danger that men who are not given to careful study of the whole subject will be misled and encouraged to indiscriminately extract the sixth-year molars. Several members of this society have said to me within the past two or three years while discussing particular cases of irregularity, "Oh, that would all come around right if you would extract the sixth-year molars," when, according to my idea of the case, it would be the very worst thing to do. I think credit should be given to Dr. Bogue for calling attention to the valuable office of the sixth-year molar, and I feel glad indeed that so many of his diagrams (notably Fig. 6 A) point that out. I think we cannot place too much force upon the retention, in the majority of cases, of the sixth-year molar. Although its extraction in a dozen cases possibly, in a practice of twenty-five years, might result beneficially, I am quite sure that if one-half the bad

results of such extraction should be presented here the evidence would be overwhelmingly against the loss of those teeth.

Dr. Howe. It is for the reason that I desire to see discrimination exercised in sacrificing teeth that I criticise statements which I believe to be untrue. I do not believe a cause is ever helped by statements made in support of it that do not bear the test of scrutiny. The effect upon the minds of those who study the subject and discover the mistake is to produce doubt of the whole argument. I did not extract, in the case marked Figs. 7 A and 7 B, to allow the anterior teeth to drop backward, as Dr. Davenport supposes, but the fact that such a movement did take place causes the results to be unfortunate. The spaces between the front teeth are very unsightly, and the dropping posteriorly of the cuspids has produced an unfortunate expression of the teeth and mouth. If it were true that the anterior teeth did not fall back, this case would not have been the failure that it is. The same retrograde movement of the front teeth made the results very satisfactory in the other cases.

Dr. Davenport. To extract such large and important teeth from arches already at fault seems to me to be anything but scientific, when we consider that the results of such extraction are of the most uncertain character. Dr. Howe, in the few cases exhibited, has had what he considers both favorable and unfavorable results, proving that if we wish to accomplish any one thing with a given arch of crowded teeth the extraction of the sixth-year molars would not be a safe remedy, for the result might easily be an increase of the original faults.

These models, Figs. 7 A and 7 B, although exhibited by Dr. Howe to disprove some of Dr. Bogue's claims, do certainly substantiate certain other claims of Dr. Bogue's, and also of Dr. I. B. Davenport's, in a marked manner.

I have already referred to two of them,—the shortened bite and the unsettled occlusion resulting from the extraction; but I would now like to call attention to the very noticeable tipping back of the cutting-edges of the lower incisors shown in the second model; and as the lower arch is in a measure the matrix which guides the movement of the upper one, this probably accounts not only for the shortening of the bite, but also for the dropping down and backward of the upper teeth. A view of the lower arch in the second model after the extraction of the sixth-year molars shows the incisors to be very much higher than the twelfth-year molars, which they are not in the first model.

I am even doubtful whether the mouths which Dr. Howe now thinks he has benefited by such extraction will continue to merit

his present good opinion of them. What I most should fear would be the vexing decay which comes at or below the margin of the gum, caused by food crowding between teeth which have either been kept by occlusion with their opposites from close contact or which have rotated and tipped while moving until the point of contact when it does come is almost at the gum. These changes come but slowly, it is true, but in many such mouths it is almost impossible to keep the teeth clean, and a sudden giving way all over the mouth results.

Dr. Howe. I have not denied at any time that the bite is sometimes shortened—may be even frequently—by the extraction of teeth. I have only denied that it is universal, and that it can be predicted with certainty. I think there is a tendency to shortening. How much or how often it is counterbalanced by a physiological elongation I hope we shall learn something about in the future.

Dr. Atkinson. I do not think I have anything special to present. I may say that I do not think our statistics are sufficient to justify us in saying we have really discovered the law governing this matter. Many times the temporary teeth will be exactly even, and occlude well with the other teeth in the mouth, and at the same time they will be as represented by Dr. Bogue's diagram of the Hollander's mouth. But that does not prove that it represents the length of the bite,—the distance of the teeth apart,—because sometimes these teeth descend and sometimes they ascend. I have seen, in cases where temporary molars were retained, the process come to the very margin, to the dental ligament, when the temporary teeth were retained into adult life. We are apt, as Dr. Howe says, to jump at conclusions which we have drawn from a few observations, and to apply them to the whole field. We do not know the whole field just yet. We do not understand enough of the law of the occlusion of teeth to predict results, especially in civilization. In civilization we have a very mixed mode of life, not at all uniform, so that it is rather spending time in polemical discussion than in the pursuit of established law.

Dr. Dwinelle. I intended to be prepared to discuss this paper somewhat at length, but I find myself, under all the circumstances, unprepared,—especially as there are still two papers to be read before us to-night. Nevertheless I want to say, in general terms, that I believe that the function and office of the sixth-year molar is a very important one. There may be exceptions to this rule. Nevertheless, I have great reverence for the sixth-year molar, and I believe it to be the tooth which, to a large extent and as a rule, locates the other teeth and gives them their normal positions.



In reference to a tendency of the remaining teeth to move backward or forward after extraction, I must confess that the teeth do not fall *backward* in their position upon the extraction of a tooth as a rule; they are more likely to come forward. We do know that upon the extraction of the sixth-year molar the twelfth-year molar will almost universally tip forward, break up its normal articulation, and assume a position in the jaw that is not normal. I have had many instances in my practice where the extraction of the inferior sixth-year molar has allowed the twelfth-year molar to tip forward, so that it had but a single point of articulation,—one case in particular, where the sixth-year molar was extracted, with the promise that the *dentes sapientiæ* would soon come and push the twelfth-year molar into the place of the extracted tooth; but thus far it has been too *sapient* to make its appearance, although the patient is over thirty years of age. I think it dangerous to meddle with the operations of nature without careful consideration; and, as Dr. Atkinson has wisely said, we have not sufficient data or statistics to enable us to form any set rules or feel that we have perfected any system that covers the ground. I hold in my hand plaster models of a very interesting case. On one side there are apparently four well-developed inferior molars. One, however, is a deciduous tooth, the crown being the largest of any of the first set, and it is taking the place of the second bicuspid. The arrangement and the articulation are perfect.

I will ask your attention a moment by saying that a friend of mine is present whom I think it would be well to call out, for he finds in these models types of different nationalities, no less than three being expressed here in one model. He points them out so clearly that he is seemingly not far from right in the premises. With your permission I will call upon Dr. Carroll to speak on the subject.

Dr. Carroll. I have been giving a little attention during the past few years to the study of what I conceive to be the differences of occlusion according to type, and peculiarities according to nationalities. I do not remember having read anything upon that point, nor have I heard much said upon it, but I have studied the subject from the stand-point of prosthetic dentistry. Being desirous of producing new forms of artificial teeth which would be more in accordance with nature, I am taking impressions of perfect sets of teeth, when I meet with them, for the purpose of getting the peculiar types which I conceive to be shown in the mouths of those persons. While in Boston recently I took the impression for the model which Dr. Dwinelle has just shown, and I remarked to the lady, "Here are shown three distinct types. Your parentage, as shown from the cuspids forward, is distinctly English; from the cus-

pids to the molars, including the cuspids and bicuspid, it is French, and from there back you are German." She remarked, "Who told you?" I said, "This tells me." She acknowledged that the nationalities I had named were represented in her ancestry.

In the beautiful presentation on the part of Dr. Bogue I find one thing in particular to very much commend, and that is the effort he made to prevent the extraction of the sixth-year molar. More than a quarter of a century ago I took the key-note from one here present, Dr. Atkinson, and it has been the key-note of my professional career not to extract the sixth-year molar. Referring to this model again, it will be noticed that there is a beautiful occlusion of the two arches with a deciduous molar still in position below occupying the space of the second bicuspid, with three permanent molars extending beyond it. A few years ago the same molar on the other side, the deciduous second molar, dropped out, and the bicuspid has not yet taken its place. Notwithstanding this space has been present eight years, there has been no dropping back of the first bicuspid, and no pushing forward of the molars. That supports the position of Dr. Bogue on the one hand, and the position of Dr. Howe on the other. But two swallows do not make a summer, and a single model cannot be taken to give a correct idea of the results of extraction.

With reference to the point made by my friend Dr. Dwinelle, it has been my observation that the French teeth differ from the English in that the bicuspid, are very deeply serrated, and the cuspids very prominent and beautifully developed. If it be true, as I believe it is, that the overlapping of the inferior central incisors is equal to the depth of the cusps of the lower bicuspid, then we have it represented in this type. You will see them overlap but very little, while the cusps of the lower bicuspid mesh very deeply. If the gentlemen will kindly give me aid in obtaining impressions of correct occlusions and perfect sets of teeth for the purpose of obtaining distinct types, I should be very glad.

The Chairman. We will pass to the paper of Dr. Brockway.

Albert H. Brockway, M.D.S., of Brooklyn, N. Y., read a paper entitled

#### NEGLECTED ADVANTAGES.

No fact seems to be more generally admitted than that the present is an age of improvement. The triumphs of steam and electricity, whereby our ready communication and exchange are so vastly promoted, are fitly supplemented by the growth of more enlightened and liberal views in science, ethics, and religion, softening and broadening in their influence, and steadily tending to bring in peace

and good-will among men. The laws of sanitary science are inquired into with a zeal born of enthusiasm, that the "pestilence that walketh in darkness and wasteth at noon-day" may be stayed. The reform of political methods is undertaken and carried forward by earnest and unselfish men to the end that good government and wise policy be promoted, and justice and prosperity prevail.

But no observant person can fail to be struck with the fact that, after all, the acceptance of new ideas and new methods is of really slow growth, limited at first to a few receptive minds; that the mass of mankind are not easily changed from the habits and methods to which they have become accustomed. To them appears as the highest wisdom the smug and satisfied philosophy embodied in the couplet:

"Be not the first by whom the new is tried,  
Nor yet the last to lay the old aside,"

forgetful that were it adopted by *all* there would be an end of progress.

Reflection upon this phase of the subject has led me to better understand what I confess has sometimes surprised me in the attitude held by so many in our own chosen profession, which is but an epitome and microcosm of the larger world.

That the improvements made within the past few years in the practice of dentistry—especially in the appliances used—have been very great, all will admit. We are, indeed, apt to speak of our progress as phenomenal and exceeding that in most other branches of human activity, which is perhaps in consequence of our nearer view. Be that as it may, the fact remains that we have at our command in the present day many advantages in the conduct of our beneficent work not possessed or scarcely even dreamed of by our fathers,—advantages which, if not neglected, but rightly employed, are capable of increasing our capacity and consequent usefulness to those under our care to a most marked degree. The statement does not readily admit of illustration by statistics, so much of the purely personal element is to be taken into the account, or I should be tempted to undertake it. I can only say, in passing, that in my individual experience as demonstrated by my recorded operations the benefit derived has been sufficient to more than double my capacity for work.

That many of these advantages are neglected by not a few among us, to their own and their patients' detriment, is to me therefore a matter of regret, and I shall endeavor in the short time at my disposal to designate a few of the more prominent improvements, and comment briefly upon their value, in the hope that thereby they may be more generally appreciated and made use of.



Not undertaking to indicate the order of importance, I shall speak of the assistant, the burring-engine, the matrix, and the separator.

And first of the assistant at the chair. There is, I am aware, in the minds of many dentists, a prejudice against the employment or presence even of another person at the operating-chair,—a prejudice which I confess I myself once shared, but which experience has shown to be unfounded and absurd to the last degree. They fancy that the presence of another will in a measure interfere with the somewhat personal and confidential relation which the dentist should hold toward his patient, and that fastidious patients might object to their employment. Granting the objection its full weight, I am convinced that it should not be for a moment considered in view of the advantages which can be set against it. To the operator aided by a trained and intelligent assistant is given another pair of hands,—and sometimes we fancy that Briareus with his hundred arms would have too few for the emergency!—another pair of eyes to look for the elusive and particular instrument required, two willing feet to fetch the needed article just out of reach, and another brain to take thought of the order and care of the surroundings. To the patient is given the service of one less preoccupied than the principal, to see to his needs, look after his comfort, and help in a hundred nameless ways to shorten the tedium and fatigue of the dreaded sitting.

Objection is sometimes made to the employing of an assistant on the ground of expense, many declaring that they cannot afford to, seeming to regard it in the nature of a needless luxury; and I have, in advocating this advantage, not unfrequently been asked what use I could find for an assistant aside from malleting.

The objection of expense can be urged against the employment of any means of improvement; but expense is relative, and what seems needless extravagance may in fact be the wisest economy. No one, however limited his practice, can afford to forego the advantage of an assistant; on the contrary, the increased efficiency and celerity which he thereby secures—to say nothing of the added comfort which is insured to his patient—will repay tenfold the probable expense incurred.

A word as to what kind of assistant. Having tried them of both kinds, I give the preference to those of the gentler sex, as being, all things considered, better adapted by nature to fill the office; and to illustrate, I will mention some of the services rendered me by the young lady who has for some time past been associated with me in this capacity.

In the first place, she looks to the general condition of the fixtures

of the office after the servants have properly swept and dusted, to see that everything is in proper order for the reception of patients; she keeps in condition the instruments and appliances used, bringing them to me as wanted and returning them to place when done with; she prepares in advance all articles that may be needed, such as absorbent paper, pellets, waxed ligatures for adjusting the rubber-dam, swabs for dressing root-canals; she assists in putting on the rubber-dam, or in using the separator or matrix; she holds away the lips or the tongue of the patient when needed, to avoid abrasion or secure a better view; prepares ready to my hand the materials for filling and assists in packing them into the cavity, and renders a thousand and one little services to the saving of my time and strength and the preservation of my good temper that time would fail me to enumerate.

The number among us who fail to make use of the burring-engine in some measure is perhaps too small to be seriously considered, yet I am of opinion that not a few fail to get from it all the advantage which they might. The operator who wastes his strength and sacrifices in some degree his steadiness of touch by driving his own engine, standing on one leg, stands no less in his own light. This matter should be delegated to an assistant, or, better still, some motor power should be employed for the purpose. There can be little excuse at the present day for not doing so. I have in my own practice for several years made use of a water motor, put in at an expense of about one hundred dollars, and costing me in taxes some eight dollars yearly, which I am confident has been a most profitable investment. The steadiness of the bur when driven by a uniform power makes its use less painful than when driven in the usual way by the treadle, besides the operator and assistant are left free to give their attention to other matters. But great as is the advantage secured by the burring-engine in the preparation of ordinary and accessible cavities, in reaching those upon the posterior surfaces of teeth far back in the mouth it is *indispensable*, if time and the feelings of the patient are to be taken into account. By the aid of the corundum-stone and the back-action hand-piece, such cavities can be readily exposed and prepared with nearly as much facility as any; while with the help of a suitable *matrix* the introduction of a proper filling is rendered far less difficult and uncertain than would otherwise be possible.

It is in such cases as these, and in those more accessible teeth where considerable loss of substance has taken place, that I find most use for the matrix in some form; and while I do not myself make use of it in filling many approximal cavities in the molars and bicuspsids, I have been surprised to hear, within a short time past,

two deservedly prominent dentists admit that they had never even *tried* such an appliance. However, I am satisfied that the matrix is too useful to be wholly discarded, though less a necessity than some other things.

The separator, as introduced in its crude form by the late Dr. Jarvis and modified by Dr. Perry and Dr. Bogue, also the forms devised by Dr. Parr, Dr. Elliott, and others, has met with a less universal acceptance than its great merit demands. It is one of the most useful devices for saving time, both to the operator and patient, that has been introduced. Nor is time alone saved, but pain and discomfort as well. By its employment not only are the teeth separated quickly without serious discomfort, but being also thereby held firmly in the changed position their sensibility is greatly reduced, as every one familiar with the use of this instrument has doubtless observed. I am aware that many quite progressive dentists have not yet availed themselves of the manifest advantage of the separator from fear that injury might be done by its use, or that it would provoke protests from their patients. This objection might be urged against almost any instrument we have, and with about as much force. I have never known of harm done by its use, while we are all familiar with cases where serious mischief has been wrought through the careless separation of teeth by the ordinary methods with wedges of rubber, wood, or cotton.

It is true that the sensation caused by the application of the separator is at the first somewhat unpleasant, possibly painful; but it is only momentary, and patients after experience with it almost universally express their preference for it over other means. The time saved by its use is no small item.

To apply it will take, let us say, at a liberal estimate, perhaps five minutes in the most difficult cases, and of course much less usually. By the ordinary method of separation nearly as much time will be consumed in getting the patient into the chair and introducing a wedge of cotton or rubber, which not unfrequently will require one or more renewals before sufficient space is gained, each renewal taking a few moments of the dentist's time and involving another visit on the part of the patient. In a full practice the aggregate waste of time is a serious loss.

But as I did not set out to cover the whole field of neglected advantages, I will not further continue. In what has been said, my desire has been to impress upon such of my professional brethren as have for any reason failed to fully appreciate the benefits of the appliances mentioned my own belief in their value, and to ask them seriously to consider whether they can afford to forego any advantages of this nature which are within their reach. If any shall be



aided in this by what has been said, I shall feel that I have not spoken in vain.

President Howe here resumed the chair.

### *Discussion.*

Dr. V. H. Jackson. This is a subject that I think will interest members of our profession more in the future than it has in the past. I appreciate fully that part of the paper which referred to the value of an assistant. I feel that I can do one-third more work with the assistants I have than I could alone, even though I took the trouble to prepare everything before the operation began.

One remark the doctor made—concerning the use of the dental engine—I do not agree with. I know that I can control the engine better if it be driven by an assistant than with any other motive-power of which I have yet a knowledge. I have used electric power to some extent; but my engine is now run entirely by an assistant. The engine is supplied with a brake, and can be stopped instantly. There are brakes of various kinds made, and there has been an attempt to attach one to the hand-piece, but I think we will all admit that it cannot be made practicable unless attached to the driving-wheel. With an assistant I find that many accidents are avoided that formerly occurred. I have gone a little further than Dr. Brockway, for I have two assistants. It was not to carry the matter to an extreme; but I found one assistant so very valuable that I thought two would assist me more. One of them takes charge of the books, sends all bills, makes appointments, etc. I do not say I should advise every dentist to have two assistants, but I cannot afford to give up either one of mine.

The secretary read a paper by J. W. Holt, D.D.S., of Goldsboro', N. C., entitled

### THE ACTUAL CAUTERY IN DENTAL PRACTICE.

In calling attention to the "actual cautery" for obtunding the sensitiveness of dentine, and drying and disinfecting cavities and canals of teeth, it is not assumed that there is any new discovery in such practice, but that it is not very generally understood or its value justly appreciated. Nor is it claimed that heat as an obtunder of the sensitiveness of dentine approaches very near to any man's conception of what such an agent should be or do, but only that it is more prompt and efficient than any known local anesthetic or caustic medication, and less painful than the latter.

Dentine is too nearly impervious to all liquids to warrant any

confident expectation that any drug will ever be found which, directly applied, can give that immediate and entire relief from sensitiveness so much desired by the dentist and his patient. Probably alcohol (absolute) comes as near meeting all of the requirements for such an obtunder as it is possible for any mere chemical or medicinal substance to do; but even with its intense affinity for the water of the dentine it is slow to be absorbed, and hence it is slow to obtund and seldom gives entire relief. In heat, however, we have an obtunding agent that is practically instantaneous in its action and complete in its results, not only on the surface, but to almost any depth we may desire to reach. Applied to dentine it is immediately conducted beyond the surface and obtunds as it goes, more or less, according to its intensity.

Hot air, as it is generally used for drying cavities and canals of teeth, has considerable obtunding effect, as has been very generally observed, but the heat of the air-blast is too low and too much diffused—lacks intensity and concentration—for positive results. The best effects of heat for disinfecting cavities and canals of teeth and obtunding the sensitiveness of dentine, if not also for drying cavities and canals of teeth, can be had only by the proper use of metal cauters of suitable size and form. When it is so applied, the results leave very little to be desired. If obtunding is the object, relief from the pain of cutting, drilling, or grinding, as well as from thermal or other irritation, will be prompt and reasonably complete.

The actual cautery is conveniently applicable to almost all surfaces, cavities, and canals of teeth, whether for drying, disinfecting, or obtunding. For obtunding, particularly, it can be confidently recommended for (1) grinding-surfaces and cutting-edges of teeth when sensitive from loss of enamel by attrition; (2) for necks of teeth exposed and sensitive from recession of the gum, whether sound or decaying; (3) for sensitive dentine exposed by separating contiguous teeth with files, disks, or chisels; (4) for sensitive dentine laid bare for permanent exposure, by polishing off shallow decay; (5) for all cavities to be prepared for filling, the sensitiveness of which requires obtunding; (6) for teeth that are being prepared for metal caps, by grinding or scaling off enamel; (7) for teeth that for any reason require shortening, by grinding or filing, so much as to expose sensitive dentine.

The same method may be followed in all cases requiring the cautery. The cavity or surface to be obtunded should be wiped dry, and in most cases it is better to control the saliva, and protect the tongue, lips, etc., with the rubber-dam. After such preparation, and timely notice and explanation to the patient, a suitable cauter heated to redness in the alcohol, or gas flame, within easy reach,

should be carried quickly to the sensitive part and held on it from one to five seconds. A little experience will enable one to decide as to the degree of heat and length of application necessary in any case. High heat with short applications, repeated as often as necessary, is, as a rule, more satisfactory than lower heat longer applied. It is quite as effective and certainly less painful. High heat or long application is safer and less painful on grinding-surfaces and cutting-edges than about the necks of teeth, also on large than small teeth; and always when the tooth-pulp is well protected by a good thickness of dentine the application may, if desirable, be longer than when the cauter is brought near the pulp. If the walls of a deep cavity are to be obtunded, which is seldom necessary, the pulp of the tooth should be carefully protected, for the time, by a cover of some good non-conductor of heat, such as asbestos or cork. And non-conductors may be used for the protection of the gum, also, when cauterizing about the necks of teeth. To avoid unnecessary pain, and to prevent anything like troublesome irritation of the tooth under treatment, the cauterized part should be tested for sensitiveness after each touch of the cauter.

On all surfaces of dentine to be polished and left exposed, except, perhaps, grinding-surfaces and cutting-edges of teeth where considerable wear may be expected, the least cauterization that will permit the comfortable use of the tooth-brush is certainly best. Deep cauterization would give no more comfort and might possibly induce decay. Such surfaces, after obtunding, and while still dry from the heat of the cauter, may, with probable advantage, be wet with creasote or an alcoholic solution of shellac and heavily burnished, for the purpose of closing the dentinal tubuli and preventing recurrence of sensitiveness and decay.

For drying and disinfecting cavities and canals of teeth, somewhat lower heat is required than for obtunding sensitiveness, but it may be longer applied. A slightly-heated cauter held in a cavity some seconds, or passed lightly over any part to be dried, will give good results. For drying pulp-canals, however, and especially for disinfecting them when they are very foul, a snipe-bill cauter may be heated to redness and thrust freely into the well-opened canal, as decided desiccation is desirable, and there is no danger that the slender point of the cauter can carry an excess of heat.

The five cauters here represented have been found to meet all ordinary requirements of dental practice, but other useful forms will suggest themselves to the intelligent dentist. The head of the cauter should have size to carry the necessary heat, but it may be well to warn experimenters against the use of large cauters which might, by excess of heat, cause troublesome irritation of the teeth, or burn



the tongue, lips, etc. Small stems in some degree prevent heating the handles of the cauters, and are strong enough for the proper use of such instruments. As to material, platinum is more desirable than any metal that blackens and scales from heating, but for practical purposes, and with due regard to economy, steel is good enough.

Some patients will at first object to the touch of a red-hot cauter to a sensitive tooth, but the pain is less than that given by zinc chloride or other "potential" caustics, because it is of shorter duration; and if the fears of the patient are allayed by the correct demeanor of the dentist and the truthful assurance that the pain though acute is only momentary, and that it cannot fail to give decided relief from sensitiveness, a trial will seldom be refused. The trial-touch of the cautery should, of course, be such as to further assure the patient, even if better obtunding should have to be done by a second or third application a minute later. Dodging from the cauter at the critical moment of a first application, whether voluntary or involuntary, may often be prevented by showing the patient just how the instrument is only to touch the tooth and be taken away instantly, so that to dodge for protection is quite unnecessary. In this, as in all other dental operations, surprises should never be attempted, but carefully avoided. By discreet management patients will learn to fear the actual cautery no more than they do the dental engine. But in this, as in everything else, the dentist will be at a serious disadvantage without the confidence of his patient.

#### *Discussion.*

Dr. Dwinelle. I think this is a most excellent paper, Mr. President. I am forever putting in the ego, and cannot help it on this occasion. It reminds me of a paper I read before the State Society at Albany many years ago. I have used the cautery in conjunction with chloride of zinc for thirty years or more. There is not much pain by its use even in conjunction with chloride of zinc. But there are times when the dentine is so sensitive that it resists every conceivable application for the time being. Sometimes it will resist the action of arsenic itself. I have found the actual cautery in connection with chloride of zinc very effective. Perhaps the actual cautery, coming in conjunction with the chloride of zinc, qualifies the natural action of the chloride. Several of my patients with sensitive teeth and cavities have been treated in this manner very successfully. I recollect a number of instances where the breath drawn in suddenly would cause such pain as to almost prostrate the patient to the ground, and an application of the cautery, with chloride of zinc, gave almost instant and permanent relief. The application has seldom to be made more than twice. In treating a tooth for such

sensitiveness I envelop it with the rubber-dam, thoroughly dry it, and at the sensitive point lay on a saturated solution of chloride of zinc. I then apply the cautery to it in the form of a steel-bulb instrument adapted to the occasion. (It is equally applicative to sensitive cavities.) I then follow it with the burnishing process, which is a very fine method of procedure for closing the dentinal tubuli.

The idea of treating pulp-canals with the cautery is a very excellent one. I think I have, a good many years ago, improved somewhat upon that by having a bulb attached to a snipe-bill instrument for the purpose of retaining the heat. The instruments used are so fine and delicate that they soon lose their heat unless they have a bulb at the shank, which retains the heat longer and will insure the proper amount of heat to the extreme end, no matter how attenuated the instrument may be. I think if the gentleman would use the cautery in connection with chloride of zinc for sensitive dentine he would obtain more permanent and satisfactory results.

The President. Has the doctor had any injury result from his use of the cautery?

Dr. Dwinelle. I have never had any injury result. Of course it must be used with judgment.

The President. What degree of heat does Dr. Dwinelle use?

Dr. Dwinelle. Never as high as a red heat. I do not find it necessary.

Dr. Carroll. Dr. Parsons, of Waumega, Kansas, has invented a little appliance to use in connection with the battery, not for cauterizing, but for the purpose of drying out pulp-canals by heat, carrying the heat up nearly to dark red. I have used it with very good results.

Adjourned.

S. E. DAVENPORT, D.D.S., M.D.S.,  
*Editor New York Odontological Society.*

#### FIRST DISTRICT DENTAL SOCIETY, STATE OF NEW YORK.

THE First District Dental Society of the State of New York held a regular monthly meeting, Tuesday evening, June 11, 1889, in the New York Academy of Medicine, No. 12 West Thirty-first street.

The president, Dr. A. L. Northrop, in the chair.

Dr. V. H. Jackson, chairman of the Clinic Committee, read the following

#### CLINIC REPORT.

A stated clinic of this society was held this afternoon at the depot of The S. S. White Dental Manufacturing Co., Broadway and Ninth street.

Dr. A. H. Stoddard, of Boston, Mass., exhibited the "improved gas furnace." It is composed of a cup-shaped casing, lined with a composition of sawdust and fire-clay. It has a Bunsen burner provided with a blast entering at the bottom, and a dome-shaped top of pure fire-clay (which is removable), with an opening about three-fourths of an inch in size in the center for the escape of the flame. It is about six inches high, and four and a half inches in diameter. The furnace is held in position by a bracket attached to the wall. The material to be baked is placed on a tray of fire-clay or platinum, supported in the interior by platinum wires or clay posts, and allowed to heat slowly till hot, when the blast is turned on, the top placed in position, and in eight minutes it is sufficiently fused, whether it be continuous gum or the hardest body used in block teeth. The amount of gas is regulated by a stop-cock, enabling one to get perfect combustion and to bake in an open flame without gasing. Dr. Stoddard baked several pieces, including three bridges with a single tooth each, put in form by Dr. E. P. Brown. Two of these put in at one time were not successfully baked, owing to the easy fusion of the material used. The third was baked but seven minutes, and was perfect. All present seemed much pleased with the furnace. It can also be used to heat for soldering, etc. The price of the furnace is fifteen dollars. . . . Dr. C. F. W. Holbrook, of Newark, N. J., did not clinic, as his patient failed him. He will put through a case of Ward's electro-metallic dental plate at a future clinic, when the different stages of the work can be seen. . . . Dr. William H. Atkinson, of New York, presented an interesting case of caries and necrosis of the lower jaw, with an external fistula in the cheek. It was understood that the trouble was caused by tardy eruption of the third molar. We hope to give full particulars of the treatment in a future report. . . . Dr. F. P. Hamlet, of Hempstead, L. I., showed a bridge of the E. P. Brown style, supporting the crowns of two left superior bicuspid in the mouth of one of his patients, that had been worn about a year, a cut of which may be found in Dr. George Evans's book on crown- and bridge-work. It is supported by a post in the root of the second left superior bicuspid (the root of the first having been lost), and a dovetailed arm extending from the bridge is anchored in a gold filling in the mesial surface of the first left superior molar. The bridge seemed to be in good repair. . . . Dr. George Reese, of Brooklyn, presented a case, a lady about twenty years old, showing the result of an external fistula in the cheek, caused by the diseased roots of the first left superior molar. The mouth could not be opened, and the doctor had the patient apply hot figs to the gum until the abscess broke, when the roots were extracted, and



the abscess was syringed with a solution of bichloride of mercury, one to five hundred. At a later stage aromatic sulphuric acid was used, and a small amount of caustic paste twisted into surgical cotton and inserted in the fistula. The scar is not very perceptible.

Dr. Dwinelle. The report of the clinic committee upon the case of tardy eruption of a tooth reminds me of one I had to-day. It is remarkable that the case I speak of is the third that has occurred in the same family, three sisters having had the same trouble. Their inferior wisdom-teeth have come up almost at right angles to their true position, so that their grinding-surfaces literally abut against the approximal surfaces of the twelfth-year molars. The wisdom-tooth coming up at right angles, becomes a source of irritation, like a foreign substance, and nature makes an effort to dispose of it. In two instances abscesses had formed before the teeth were taken out, leaving a large amount of necrosed bone beneath, which we burred out. Had these foreign substances not been removed, I have no doubt osteo-sarcoma would have resulted.

In extracting such teeth, imbedded as they are in the jaw, I used a forceps constructed with two wedges that approach each other. As I inserted the wedge-beaks of the forceps between the twelfth-year molar and the wisdom-tooth I depressed its handle like a lever, thus elevating the tooth from its position. In one instance, instead of elevating the tooth with the wedge-forceps, the tooth was forced directly backward into the cellular structure of the jaw, leaving quite a space between the teeth. On a second effort I drew the tooth forward and extracted it. Here I found quantities of pus and dead bone, which I removed. A somewhat prolonged treatment with sulphuric acid effected a permanent cure.

Dr. Atkinson. The treatment in the case referred to in the clinic report is only begun. I was requested to diagnose the case. There was some ambiguity about it. The entire set of teeth are very handsomely developed. This trouble seems to have originated at the time of the eruption of the right inferior third molar. The anterior cusps came through well enough, but the operculum from behind kept annoying the patient. He had several operations made to cut away the gum, at last resulting in a reaction so high that the face was swollen very much. He called upon his dentist, who opened into the swelling inside of the mouth, with three incisions, cutting transversely, and not getting any pus. It was at first treated by a physician in like manner; then he went to a dentist, who made some sort of an operation, and failed to get into the pus-cavity. In February the physician, by poulticing, induced the abscess to point on the cheek opposite the second bicuspid; and they have

been treating it from that time to this, with some ambiguity. There was uncertainty in my own mind until after making the third attempt to explore to the bottom of the sinus, which I did at the clinic to-day. The efforts of nature to heal had made several strictures of connective tissue, so the channel was somewhat tortuous, making it difficult to reach the depth of the cavity with the probe. We finally succeeded, and struck a portion of carious bone, and thus made the diagnosis. We rinsed out and injected the whole chamber with aromatic sulphuric acid, the acid full strength, and packed into the chamber a tightly-twisted tent of cotton, wet with creasote and oil of cloves, washing off the external part with vinegar for the purpose of preventing the creasote irritating the surface at the fistule. We then dressed it with Husband's plaster, and sent the patient to Dr. Bliven, of Worcester, with instructions to renew the same treatment each day, and to pack the tent as tightly as he could, to enlarge the opening down to the diseased bone, thereby making it more easy of access for burring out.

The President. Dr. Atkinson spoke about this gentleman having had the gum cut away from over the wisdom-tooth,—I suppose for the purpose of furthering its development. I would like to ask the doctor what success he has had in removing soft tissue from over wisdom-teeth, where the gum lay on top of the tooth.

Dr. Atkinson. I never fail in getting good success, and having the tooth come up nicely.

The President. Do you cut it with scissors?

Dr. Atkinson. I have done it in all sorts of ways. I now use a little instrument, like a punch, that slips under the gum. The only difficulty lies in the timidity of the operator, in failing to take away enough of the overhanging gum. It is a nasty, loose, flabby tissue at best, and you need not be afraid of cutting it away.

Dr. Ryneear. That was my own experience in one case. I was a little timid about taking too much of the tissue away, and the operation was not successful. At the second attempt I made quite an incision and removed a large piece of the overhanging gum, and from that time the patient had no trouble at all.

Dr. E. P. Brown. Mr. President, may I ask your indulgence for a moment in regard to the exhibit of Dr. Stoddard? After Dr. Jackson left the clinic we succeeded in baking a porcelain tooth, in the form of a bridge, in seven minutes, with Dr. Stoddard's furnace. I will pass this tooth around, and would like to have the society invite Dr. Stoddard to make some remarks on this subject. This tooth was baked in exactly seven minutes from the time we took it from the alcohol lamp where it was partially heated up. An examination of its labial surface will show that there has been no

gasing; on the contrary, the labial face of the tooth has been actually improved in the baking. I selected this tooth myself. I have tested the Verrier furnace in baking fifty bridges in England; I tested the Land furnace here some months ago, and I have baked bridges for five years in the old continuous-gum furnace in my office, and I have never seen anything that turned out the porcelain as well as this furnace does, or that to my mind seemed as philosophical as this furnace seems. In all other furnaces blasts are supplied at certain points through the muffles, and that keeps the gas there,—actually generates it. With this furnace there is nothing of that kind. We put the baking in as if we hung it in a basket in a chimney-flue; the heat passes around it, and the gases are burned up as the heating goes on. No gas can be held there to the injury of the porcelain.

Dr. A. H. Stoddard. Mr. President and Gentlemen: I do not know that I can add much to what has been said in regard to this furnace. Perhaps it may interest some of the members to know the successive stages through which we went in order to reach this perfect simplicity. The idea of a gas furnace was suggested to us, last June, by one shown by Dr. Stanton at the Massachusetts Dental Society, in Boston. We thought that by reducing the size of the furnace we might be able to accomplish the same object in a shorter time, and with less material, less gas, and less air-blast. With his (Stanton's) furnace it was necessary to use motive power to furnish the blast. We made our first furnace of fire-brick entirely square, intending to inclose a fire-clay muffle in the center. After testing that, and finding it imperfect, we tried it with a fire-clay muffle, and that worked a little better. We were able to fuse the body in a comparatively short time,—about twelve minutes, I believe. Our great difficulty was gasing. We partly obviated that by running a pipe through the side of the furnace into the muffle. That was not original with us; that was Dr. Land's idea. We tried introducing a pipe from the burner up through the bottom of the muffle, which was virtually the same thing. We baked a square box first, made of fire-clay, then one of platinum. After reading an article by Dr. Rollins, of Boston, stating that if, in his furnace, he allowed the amount of gas to go above a certain point gasing resulted, we came to the conclusion that gasing was due to imperfect combustion; and we found that by getting perfect combustion we could get over this difficulty, and were able to bake in an open furnace. That is the only point in which this furnace differs from other furnaces. The principle is about the same as that of the Fletcher furnace, used in melting metals; but baking teeth in an open flame has not been done before that I know of.



Dr. Brown. I did not hear Dr. Jackson mention in his report the fact that this furnace succeeded in getting up the greatest heat in the time allowed of any furnace that we have yet seen,—so much that I was enabled to put in two bridges of different kinds, and we melted those bridges like molasses candy. The trouble is in getting enough speed. If you have the speed, you can put on the brake and gauge it to suit your purpose. This furnace got up a heat in eight minutes that I never saw surpassed. It melted the S. S. White teeth down as though they were made of wax. The trouble with the continuous-gum furnace has been in getting enough draft, and the large quantity of gas needed to generate the necessary heat. With this furnace you can in five or ten minutes get sufficient heat to fuse any of the bodies, even the harder bodies that the S. S. White teeth are made of. The English body, the continuous-gum body, and other bodies flow at a much lower temperature than the bodies of which porcelain teeth are made.

#### INCIDENTS OF OFFICE PRACTICE.

Dr. M. L. Rhein. At a special clinic of this society held on October 15, 1886, Dr. W. J. Younger implanted an inferior central incisor in the mouth of Dr. C. L. Andrews. The subsequent loss of this tooth through absorption of the root, a year and a half afterward, was detailed by me at length in my report of the Committee on Practice before the State society meeting in 1888. At the clinic of our society held last November Dr. R. Ottolengui implanted another tooth in this space for Dr. Andrews, which was duly reported and illustrated in the January number of the *DENTAL COSMOS*. In performing this operation Dr. Ottolengui adopted my method of holding loose teeth in position undisturbed, by uniting it to the adjoining teeth by means of a wire laid in a groove in their cutting-edges and filled in with gold foil, and this in turn covered with gold and platinum foil. In the May number of the *International Dental Journal* there appears a communication from Dr. E. A. Bogue, of our society, severely criticising the manner in which this implanted tooth was united to the two adjoining ones. Although vigorously opposing every form of implantation of *natural* teeth, the criticism being confined to this method of uniting teeth urges me to show the sophistry of this so-called criticism. It is quite evident that so keen and intelligent an observer and such an excellent operator as Dr. Bogue is has never seen one of these operations, or he never would have made the contradictory statements that appeared in his communication. The late lamented Dr. Marshall H. Webb was often heard to remark that he "preferred one of his gold fillings to the best tooth-structure ever created." Dr. Bogue in his criticism supplements

this by the following: "If all crevices and crannies existing in a tooth can be filled with any indestructible substance and the surface made flush with the smooth surface of the tooth, so that it may all be kept clean from deposits on every side, that tooth is practically free from decay so long as it is kept clean." Now, this is exactly what has been done in Dr. Ottolengui's operation, and is the only way such operations should ever be performed; that is, to leave them as any good operator would leave his best specimen of a gold filling. The operation was devised to hold teeth, however loose, in a firm position, and *to prevent the assemblage of bacteria*, while every other form of holding loose teeth in a firm position materially assisted in gathering around these teeth immense quantities of the various forms of bacterial life. To quote further from Dr. Bogue, "Before a wall of perfect enamel, germs are inoperative and powerless. Nature's form and arrangement of perfect teeth is such that this wall must be breached before these microscopic enemies can get any foothold." In performing this operation the groove is always made through the cutting-edges of the teeth, a position where this *wall of perfect enamel is breached* early in life; in fact, in cases like the one reported at our November clinic (involving the inferior incisors), the enamel soon disappears entirely from the cutting-edges, as it had disappeared from the cutting-edges of Dr. Andrews's incisors. According to Dr. Bogue's own statement, from which I have already quoted extensively, he admits that such surfaces as these present a most inviting field for the legions of bacterial scavengers to *promote* caries in the exposed dentinal structures. I cannot see how the filling of such *crevices* and *crannies* with gold which has been made flush and smooth with the unbroken wall of enamel on every side can be made a *special nest* for the breeding of multifarious bacteria.

Dr. W. H. Atkinson here read a paper entitled

#### ORIGIN OF THE ORGANS OF SENSE.

Differential consciousness operates the sense of feeling, idea, thought, opinion, belief, knowledge.

These mutations in consciousness constitute the degrees of psychic feeling, and lay the foundation for the separate senses of living beings in touch and the various modifications of impacts, the storing of which initiate sight, hearing, smell, taste in localized protoplasmic mass in protista, protophyta, and protozoa as temporary storehouses of the radiancy that infills the voidness of these masses until they become enabled to reach individuality by irradiating the energy in successive emotive and motive efforts which result in evolving separate psychic and bodily activities, the succession of which produces the organs of sense, locomotion, and seats of affection,

limiting and classifying psychic and bodily configurations belonging to inhabitants of planets. Teleological impacts of radiance come from solar and stellar sources, and by continued repetitions constitute memory, the indispensable prerequisite of choice, without which selection of food and associates is impossible.

From the gatherings of molecular mass planets arise in nebulous cirrhi or curlings and whirlings, repetitions of which are seen in the initiation and maintenance of infusoria, rhizopods, mollusks in general, invertebrates, vertebrates, and mammals, as displayed in evolution of organs of sense and motion as seen in embryology, or reproduction of order, class, genus, species, and variety in protista, protophyta, protozoa, and their outcome in the more complicated inhabitants of earth, air, and water, upon which naturalists have spent such a world of labor and research in the efforts to unravel and formulate recorded statement of their appearance.

A sevenfold series of involution in consciousness is the limit and measure of possible evolution of function and being as parts of being in general.

This series of the differential manifestations in consciousness consists of catching and storing of emotive radiancy in concentrating degrees from the first stage (feeling) to the last stage (knowledge), a holding *now* of adequate measure of fullness of comprehensive and volitive power embodied in each infinitesimal representative of the *whole*, viz.: *inspiration* (taking breath), *feeling* (agitation), *idea* (taking form), *thought* (further formulation), *opinion* (definition of form continued), *belief* (arrangement of definition ready to be completed in), *knowledge* (present holding of identity of *appearance*—*personality*).

To bring feeder and food together, appetite (passion) and desire operate through intellect and affection in fulfillment of individual need for food and society.

The whole range of infusoria are without differentiated organs of prehension, digestion, and appropriation of food elements, which become incorporated into the special bodies of these indifferent systems by improvisation of mouth, alimentary tract, and point of exit or anus, thus performing all the functions of the higher orders without permanent organs of prehension, deglutition, digestion, and defecation of refuse contents of the alimentary apparatus, temporarily doing the work of the complicated machinery of the invertebrate, vertebrate, and mammalian forms of feeders.

When digestory agitations have effected solution and admixture of food into pabulum, appropriation of the digestory product nourishes the feeders by incorporation into their bodies by a process known as assimilation.



The provable example of this notable performer of every function of individual existence of undifferentiated protoplasm (*amœba*) is no less than homogeneous nerve-mass out of which all varieties of tissue take origin and present us with the organs of psychic and bodily sense in differentiated examples in the cerebro-spinal and ganglionic nervous systems in successive steps of accretion of stored power throughout the range of mollusk, invertebrate, vertebrate, and mammalian conformations of factors of sense and bodily function.

Our present greatest need is an elaboration of the observations of naturalists into a classified system of involution and evolution and perfectibility of career of the already recorded examples in natural history and the ecosophy of psychic and reproductive function. Continuity and contiguity of impact constitute identity and difference in psychic and bodily movements in emotive and motive substance out of which function and factor of function is made to appear.

Continuity of psychic impact is the prerequisite of memory by imparting the mode of consciousness to the neural mass in which it is received and stored. This neural center then becomes the organ of memory in psychometric unison with the type prefigured in consciousness. If continuous impacts produce uniformity of structure, and contiguous or merely concomitant impacts produce difference of structure, it will also initiate difference or variation of function. All this and more will appear in the process of fecundation.

The origin of the impacts which are the source of the ganglionic and cerebro-spinal nervous systems is attributable to stored solar and stellar radiance.

The voluntary system acquires the radiance during the night, in the absence of the direct solar ray.

The involuntary (sympathetic) system acquires its power, waking and sleeping, from stellar sources. The rays of radiance from suns and stars (distant suns) are represented in infusoria by embodiments known as trychocysts, which are the armament for capture of prey improvised out of the forward portions of the ectosarc.

Time and strength would fail us if we attempted to adequately follow the specialization of organs belonging to the entire system composing individual bodies, such as non-striated and striated forms of muscle, the corpuscular and fibrous or gelatinous and tubular form of nerve, bone, cartilage, tendon, skin, and mucous membrane. Let us content ourselves for the present in quoting from Binet some recorded observations by which to justify the condensed doctrine contained in this paper:

"In a large number of animalcules the prehension of food is preceded by another stage, the search for food, and, in the case of

living prey, by its capture. We shall not investigate these phenomena among all the protozoa, but shall direct our attention to the ciliated infusoria. Their habits are a remarkable study. If a drop of water containing infusoria be placed under the microscope, organisms are seen swimming rapidly about and traversing the liquid medium in which they are, in every direction. Their movements are not simple; the infusory guides itself while swimming about; it avoids obstacles; often it undertakes to force them aside; its movements seem to be designed to effect an end, which in most instances is the search for food; it approaches certain particles suspended in the liquid, it feels them with its cilia, it goes away and returns, all the while describing a zigzag course similar to the paths of captive fish in aquariums; this latter comparison naturally occurs to the mind. In short, the act of locomotion as seen in detached infusoria exhibits all the marks of voluntary movement.

"The hunter infusoria are constantly running about in quest of prey; but this constant pursuit is not directed toward one object any more than another. They move rapidly hither and thither, changing their direction every moment, with the part of the body bearing the battery of trichocysts in advance. When chance has brought them in contact with a victim, they let fly their darts and crush it; at this point of the action they go through certain maneuvers that are prompted by a guiding will. It very seldom happens that the shattered victim remains motionless after direct collision with the mouth of its assailant. The hunter, accordingly, slowly makes his way about the scene of action, turning both right and left in search of his lifeless prey. This search lasts a minute at the most, after which, if not successful in finding his victim, he starts off once more to the chase and resumes his irregular course.

"In constant pursuit of its prey, the leucophrys seizes its victim by the two stout vibratile lips with which its mouth is armed, and swallows them alive and whole. The victims may be seen struggling and tossing about for a time in the interior of the leucophrys's body, and afterward to expire slowly under the action of the digestive juices of the vacuole in which they have been inclosed. Placed in a medium well stocked with small ciliates, the leucophrys have their bodies constantly crammed with victims swallowed in the manner above described. Like the other hunter ciliates, the leucophrys does not espy its victims from a distance, and does not guide itself toward them. It simply darts about from right to left, every moment changing its direction. It thus increases its chances of coming in collision with its prey, and every time that one of its unfortunate victims falls in contact with its vibratile lips it is seized, irresistibly drawn toward the mouth, and swallowed in a few seconds.

"The prehension of food by the didinium exhibits interesting aspects, which have not as yet been observed in any other infusory. M. Balbiani, in his first observations, had often been surprised at seeing animalcules that the didinium had passed by without touching suddenly stop as if violently paralyzed; whereupon our carnivorous specimen straightway approached and seized them with seeming facility. More careful examination of the didinium's actions soon furnished the key to this enigma. If, while swiftly turning in the water, the didinium happens in the neighborhood of an animalcule, say a paramecium, which it is going to capture, it begins by casting at it a quantity of bacillary corpuscles which constitute its pharyngeal armature. The paramecium immediately stops swimming, and shows no other sign of vitality than feebly to beat the water with its vibratile cilia. On every side of it lie scattered the darts that were used to strike it. Its enemy then approaches and quickly thrusts forth from its mouth an organ shaped like a tongue, relatively long, and resembling a transparent cylindrical rod; the free extended extremity of this rod it fastens on some part of the paramecium's body. The latter is then gradually brought near by the recession of this tongue-shaped organ toward the buccal aperture of the didinium, which opens wide, assuming the shape of a vast funnel in which the prey is swallowed up.

"There exist organisms which lead a life of habitual isolation, but which understand how to unite for the purpose of attacking prey at the desired time, thus profiting by the superiority which numbers give. The *Bodo caudatus* is a voracious flagellate, possessed of extraordinary audacity. It combines into troops to attack animalcules one hundred times as large as itself, as the colpods, for instance, which are veritable giants when placed alongside of the bodo. Like a horse attacked by a pack of wolves, the colpod is soon rendered powerless; twenty, thirty, forty bodos throw themselves upon him, eviscerate and devour him completely.

"All these facts are of primary importance and interest, but it is plain that their interpretation presents difficulties. It may be asked whether the bodos combine designedly in groups of ten or twenty, understanding that they are more powerful when united than when divided. But it is more probable that voluntary combinations for purposes of attack do not take place among these organisms; that would be to grant them a high mental capacity. We may more readily admit that the meeting of a number of bodos happens by chance. When one of them begins an attack upon a colpod, the other animalcules lurking in the vicinity dash into the combat to profit by a favorable opportunity.

"A remarkable circumstance in this connection is, that the copu-



lation of the spermatozoid and ovula is not without analogy to the copulation of the two animals from which they originated. The spermatozoid and the ovule to some extent repeat on a small scale what the two individuals perform in their larger sphere. Thus, it is the spermatozoid that, in its capacity of male element, goes in quest of the female. It possesses, in view of the journeys it has to make, organs of locomotion that are lacking in the female and are useless to it.

"The spermatozoid of man and of a great number of mammals is equipped with a long tail, the end of which describes a circular, conical movement, which together with its rotation about its axis determines the forward motion of the spermatozoid. The spermatic element in directing itself toward the ovule to be fecundated is animated by the same sexual instinct that directs the parent organism toward its female.

"In the higher animals, the movements of the spermatozoid that is endeavoring to reach the female exhibit a peculiar character which it is important to emphasize: these movements do not appear to be directly provoked by an exterior object, as those of micro-organisms are; the spermatozoid endeavors to reach an ovule which is frequently situated a great distance away; this is the case particularly with animals that fecundate internally,—with birds and mammals.

"A fact that is important to mention in a general way is the length of road the spermatozoid has to traverse before coming up with the ovule.

"Let us now follow the spermatozoid in its journey to the ovule. It is known that the road it has to traverse is, in certain instances, extremely long. Thus, in the hen the oviduct measures sixty centimeters, and in large mammals the passages have a length of from twenty-five to thirty centimeters. We might ask ourselves how such frail and minute creatures come by a power of locomotion great enough to enable them to traverse so long a path. But observation discloses the fact that they are able to overcome obstacles quite out of proportion to their size. Henle has seen spermatozooids carry along with them masses of crystals ten times larger than themselves without appreciably lessening their speed. F. A. Pouchet has seen them carry bunches of from eight to ten blood-globules. M. Balbiani has attested the same fact. These globules, which have fastened themselves about the head of the spermatozoid, have each of them a volume double that of the head. Now, according to Welcker, the weight of a globule of human blood is .00008 of a milligram. Allowing that the spermatozoid has the same weight, we may then say that it is able to carry burdens four or five times heavier than itself."

*Discussion.*

Dr. Dwinelle. The paper which Dr. Atkinson has just read is certainly a very interesting, scientific, and entertaining one; still, it is so comprehensive in its character that we cannot undertake to discuss it in one evening. It deals with so many facts and principles that we hesitate to grapple with it. It is interesting in this respect, that it shows us that nature is very much the same as manifested in infusorial life as we go downward through the aid of the microscope; it shows us that habits and intelligence prevail there very much the same as with us. His exposition of the ways of these infinitesimal creatures is exceedingly interesting. The whole paper, which I approve of by faith, if not wholly from observation, is so immense that it seems to me better to defer the discussion to a more propitious occasion. While the telescope reveals to us an eternity of space above us, the microscope unfolds to us an eternity of space beneath, showing us life, action, instinct, and intelligence in the vast busy circulating creation revolving at our feet, all of which are governed by fixed and indispensable laws, the same as with man and the universe at large. As with the telescope we can go onward and upward, only limited in our researches by the diameter of our objective, so with the microscope new beauties and discoveries continually unfold themselves with ever-increasing interest until our objective touches the object itself, which alone limits our further research. Reasoning from analogy, we are justified in believing that if it were possible for us to go downward as we can go upward in our researches, the unfoldings and discoveries would continue to go forward and onward in this direction to fields unlimited.

We have to congratulate ourselves that so many beautiful truths and laws have been so charmingly presented to us to-night.

Adjourned.

## AMERICAN MEDICAL ASSOCIATION—SECTION OF ORAL AND DENTAL SURGERY.

(Concluded from page 644.)

### SECOND DAY—*Wednesday, June 26.*

THE section was called to order at 2.30 P.M.; Dr. W. W. Allport in the chair. The following were elected officers for the ensuing year: Chairman, J. L. Williams; secretary, E. S. Talbot. Dr. Allport said that they had expected to have received the address prepared by Dr. Rehwinkel, but it had not come to hand.

Dr. John S. Marshall read his paper upon

THE CARE OF THE TEETH OF PREGNANT WOMEN,  
of which the following is a synopsis:

From time immemorial pregnancy has been recognized as having a deleterious effect upon the teeth, and so generally does this idea prevail that it has crystallized into the saying, "For every child a tooth."

All writers upon gestation and the care of pregnant women recognize that women are more liable to suffer with diseases of the teeth and facial region during gestation and lactation than at any other time.

The causes, prevention, or mitigation of these derangements have received but little attention; in fact, it seems to be considered by most practitioners that they are inevitable consequences of gestation and that but little can be done to relieve them. I do not concur in this view, and believe that much can be done to prevent or lessen the suffering incident to caries, loss of the teeth, and the neuralgic affections so common at this period. In order to appreciate the causes and the treatment of these derangements we must have in mind the changed conditions.

The pregnant state is characterized by many and varied changes in the general system and in special organs. Most marked are those of the uterus, genitals, and mammary glands, but these it is not necessary for us to describe. The changes which bear a closer relationship to our subject are those of nutrition, which affect the condition of the blood, the bones, the teeth, and the excretions and secretions.

Pregnancy usually exercises a favorable influence upon nutrition; after the third or fourth month the appetite improves, adipose tissue is formed, and the body weight is progressively increased, so that at the completion of gestation it is about one-thirteenth greater than before. Many times, however, the reverse of this is met with. The blood is increased in volume during the second half of gestation, as was demonstrated by Spiegelberg and Gesheidlen in experiments on pregnant bitches. Authorities, however, are not agreed as to changes in the character of the blood. Some claim that the watery elements and the white corpuscles are increased and the red corpuscles diminished; others deny this. Hypertrophy of the left ventricle of temporary character sometimes occurs as a result of increased labor thrown upon the heart consequent upon the augmentation of the blood-mass.

Venous congestion, varices and swelling of the lower extremities, and arterial hyperemia of the upper half of the body are frequent accompaniments of pregnancy. These conditions are attributed to pressure of the gravid uterus upon the iliac veins, preventing the return of the blood to the inferior vena cava, and pressure upon the descending aorta, thus obstructing the normal flow of blood to the lower extremities.



Changes in the constituent elements of the bones are of common occurrence as a result of malnutrition, and softening of the bones undoubtedly takes place to a limited extent in many cases of pregnancy. In fractures which take place during gestation union is often delayed, sometimes till after delivery. A case has been cited in which fracture of the tibia and fibula occurred nine days after the suppression of the menses, and in which union was delayed till the end of gestation. The process of union began ten days after delivery, and was completed at the end of a month. On the other hand, the bones of the extremities frequently increase in length, and osteophytes are sometimes formed both intra- and extra-cranial.

Lawson Tait is authority for the statement that the thyroid gland frequently increases in size during pregnancy, and he noted that in districts where goitre was endemic and in women in whom there existed a predisposition thereto pregnancy produced a temporary form of the disease or furnished the exciting cause for the development of the permanent disease.

The spleen in all probability is increased in size during gestation. The function of the kidneys is also somewhat heightened, and they consequently become larger. The urine undergoes changes both in quantity and quality; the aqueous elements are increased in consequence of the augmentation of the blood-mass and the high arterial tension. Analysts have found the chlorides increased in the urine, and the phosphates, sulphates, urea, uric acid, creatin, and creatinin diminished in amount. It has been suggested that this deficiency is due to the extra demand for these substances in the development of the fetus. Glucose and albumen are not infrequently present in the urine during pregnancy.

An increase in the salivary secretions is often a noticeable symptom. Ptyalism, when present, manifests itself early, and usually disappears spontaneously between the third and fourth months. It occasionally persists, however, in an aggravated form during the entire period of gestation, and even for several weeks after, and the amount secreted may be so great as to endanger the life of the patient.

The qualitative changes in the saliva during gestation are sometimes quite marked. The water is increased, while the organic and inorganic elements are diminished. Schramm reported one case in which the ptyalin was entirely absent. In those cases in which excessive ptyalism is manifested, the buccal mucous membrane is more or less inflamed; the parotid, submaxillary, and sublingual glands are swollen and tender, and quite painful when their functions are especially excited. Fetor is not prominent, and the absence of this symptom distinguishes it from mercurial ptyalism. The

cause of this disorder is probably a reflex neurosis, and it frequently reappears in successive pregnancies. Gingivitis is another common accompaniment of pregnancy, and is often present when there is no evidence of salivation. Pinard is of the opinion that it is more common among multiparæ than primiparæ. This opinion is based upon seventy-five cases, of whom forty-three were multiparæ and thirty-two primiparæ. In the former the disorder was present thirty-one times, in the latter fourteen. Gingivitis is characterized by redness and tumefaction of the gums, and a tendency to bleed on slight pressure or friction, as in mastication or the use of the tooth-brush; while the secretions of the mucous gland are often decidedly acid in reaction, as may be easily proved by litmus paper. Treatment should consist in saline cathartics and astringent antacid mouth-washes, and thorough cleanliness of the mouth and teeth.

Phagedenic pericementitis is occasionally present during pregnancy, and it may be noticed in passing that it is also frequently a concomitant with rheumatic affections, diabetes mellitus, and albuminuria. The precise relation of cause and effect in these associations is not clear, but they are probably due to the accumulation of effete products in the system, possibly of uric acid, urea, and the like. This disorder is characterized by tumefaction of the gums, which have a purplish tint along the margins. The festoons are swollen and detached from the teeth, and bleed on slight provocation. The teeth become loose in their alveoli, from which pus exudes. In a majority of cases examination of the roots of these teeth will show them to be more or less covered with calculus, the character of which is still in dispute. Some claim that it is salivary, others serumal. After a little time the gums begin to recede from the necks of the teeth, and it is not by any means rare for the disease to progress so rapidly that one or more teeth are lost before the completion of gestation. The disease usually persists after delivery, but not with such rapid progress as before. Treatment consists in removing the deposits from the affected teeth, incising the gums down to the bottom of each pocket to give drainage for the escape of the discharges, the application to the parts of a saturated solution of iodine in wood creasote, and the use of astringent and antiseptic mouth-washes.

The changes in the nervous system due to the effects of pregnancy are many and varied, the character being determined by the individual susceptibility of the patient to nervous irritation. As a rule, the emotions are more easily excited than at other times. Some are bright and happy, others despondent, moody, or peevish. Functional disorders of the special senses are not infrequent. Vision may be impaired, the hearing affected, or perversions of taste or smell may occur.

Neuralgic affections are quite common during pregnancy, and usually affect the face and head. Odontalgia, *tic douloureux*, local anesthesia, and paresis are common. Odontalgia is generally the result of dental caries, which penetrates to the pulp and sets up an acute or chronic pulpitis, or may be caused by hyperemia of the pulp due to the augmented volume of blood, increased arterial pressure, and capillary hyperemia of the upper half of the body. This form of odontalgia may often be relieved by a brisk cathartic. A congestive headache may be relieved in like manner. The cathartic relieves the general arterial tension and local hyperemia of the parts by depleting the circulation, and thus lessens the blood-pressure upon the nerve-filaments of the pulp or the meninges of the brain, and the pain ceases. Odontalgia due to pulpitis can be controlled by devitalizing the pulp, and the tooth be made permanently useful by appropriate treatment. A temporary stopping is all that should be attempted till after delivery if the attack occur during the latter months of gestation, but in the earlier months there need be no fear in the majority of cases in performing a permanent operation, if it be not too fatiguing.

Nervous disorders due to the changed condition of the system during pregnancy usually disappear soon after delivery, but they occasionally persist during lactation. The treatment of neuralgic conditions of reflex origin, and nervous disorders in general, should be relegated to the family physician, as they need general treatment, and therefore come more especially within his province.

The statement has been made that softening and decalcifying of the bones take place to a limited extent in certain cases of pregnancy; but whether the change is due to a failure of the nutritive process to supply the waste constantly going on in all the tissues of the body, or to an actual resorption of the inorganic material to supply these elements to the forming fetus, has not been determined. It is probably the result of both faulty nutrition and the lack of supply of the proper elements to the system. In some cases it is certainly the direct result of faulty nutrition incident to the pregnant state; in others, inability to take food, as in those cases where for months the stomach is in such an irritable state as to make it impossible to retain sufficient food to properly nourish the body; while in others it is the result of an improper diet.

Many women are in the habit of discarding during pregnancy those foods which contain an abundance of lime-salts, and restrict themselves as nearly as possible to a fruit diet, believing that by such practice the bones of the child will be imperfectly calcified, and thus parturition will be robbed of much of its suffering. There is no scientific evidence that such a result will be obtained. The



fact seems to be well established that the osseous framework of the infant is sometimes formed at the expense of the maternal organs.

We have no knowledge that a chemical analysis has ever been made of the teeth of an individual before and during pregnancy in a case like those described, and without such analysis it could not be dogmatically asserted that there was or was not a quantitative change in the inorganic materials of the teeth; but, reasoning from analogy, we would expect to find the same conditions existing in the teeth that are undoubtedly present in the bones, and brought about by the same causes. Clinical observations would seem to substantiate such a proposition, for every observing and thoughtful dentist of even limited experience could relate cases in which an appreciable softening of the dentine occurred during the pregnant state in many of his patients. This change in the density of the dentine is an important predisposing cause of caries, and is often present in adults and in school-children of both sexes, as a result of overwork, anxiety, or excessive mental strain.

The principal exciting cause of caries during pregnancy, as in all other cases, is the ever-present lactic-acid fermentation, but its action is greatly augmented by the changed condition of the salivary and buccal secretions. The acids found in the secretions of the mouth as a result of the disorders incident to the pregnant state are acetic, hydrochloric, uric, and oxalic; consequently, in cases where the dentine has been rendered abnormally soft,—deficient in calcium salts,—there is likely to be a very rapid breaking down of tooth-structure during pregnancy and lactation. Long, tedious operations like the restoration of contour with gold in decayed teeth are unadvisable during gestation. All operations upon the teeth at such times should be as free from pain and fatigue as possible, from the fact that in certain cases miscarriage might result. Caries of the teeth can be arrested by the use of temporary fillings like Hill's stopping or oxyphosphate of zinc until such time as the patient is in condition to bear the nervous strain incident to more elaborate operations.

Among the most valuable preventive measures are a thorough and frequent use of the tooth-brush and floss silk at least three times a day, supplemented by tooth-powders and antacid washes.

#### *Discussion.*

Dr. Jacob L. Williams said the change in the fluids of the mouth during pregnancy precedes and causes the change in the structure of the dentine. The acid condition of the fluids favors the beginning of decay. The teeth under this condition become soft and very liable to be attacked by caries, and when this condition is past they become hard again. These are facts he knows from observation.

He did not have much faith in mouth-washes, because they do not penetrate the pockets in the teeth, which are protected by a viscid fluid or semi-fluid secretion, and the wash goes right over the places where their effect is needed; has found borax to be much better than any wash. The method of using it is to apply the powdered borax to the teeth and allow it to remain a half-minute or so; by this time the fluids of the mouth will have dissolved the sharp corners and edges off the grains of borax; then it should be brushed off with a whirling motion of the brush, not with a horizontal movement. With a soft brush the gums will not be irritated, and the pockets and interstices will be thoroughly cleansed. When pregnancy is the cause of pyorrhea alveolaris, we must not expect the trouble will cure itself immediately upon expiration of the term. It will usually continue for some time after delivery, and, unless treated, will become chronic.

Dr. W. X. Sudduth said the paper was an excellent one, but he would suggest that its title was too limited. It would better have been "Care of the *Mouths* of Pregnant Women." The points brought out in regard to the effect of the pregnant state upon the osseous system are true, and we have all noticed it; but the teeth are of a different structure from the bones, and there is no connection between caries of bone and decay in the teeth. The bone is a vital tissue filled with vital cells which act upon the tissue around them. A tooth, on the contrary, is entirely passive in the process of decay, except the reaction of the lime-salts upon the acids of decay. He had come to this conclusion as a general pathologist, and felt entirely confident about it. If there was any doubt in his mind, he would still be hunting for the vital force in the tooth, which he has never yet found. A lowered nervous condition will result in salivary acid, but this will never produce decay, though it may produce erosion. When he speaks of decay, he means decay of the dentine. Decay of the enamel is a process of decalcification, and may come from an acid condition. It is erosion, and if the action of the acid is local, the acid arising from a localized inflammation of the mucous membrane of the lip, cheek, or gum-tissue, still it is erosion. This erosion is not decay, nor will it cause decay; a tooth standing alone will never decay even if the saliva is acid. Decay must arise from a ferment.

In regard to the belief that every child costs a tooth: in his experience physicians attending a woman in pregnancy seldom suggest the cleaning of the teeth, and the woman will lie in her bed for two or three weeks or a month till she complains of loss of appetite, bad taste, etc., and all because she has not had her mouth and teeth properly cleansed. The particles of food are allowed to

remain about the teeth, and decay begins from this cause, while it is ascribed to her pregnancy. The same thing happens with cases of typhoid fever. The same cause explains the recurrent periods of decay at the ages of fifteen, twenty-seven, thirty-five, and forty-five years. Dr. Flagg says that the decay is more frequent at these ages because the vital powers are depressed or overtaxed.

Dr. Williams. About this acid condition: we know that the acid does exist, that it is lactic acid, and that it does corrode, not erode, the teeth, and that this action does favor decay. It favors the fermentative action. Erosion is the smooth removal of the surface of the enamel, just as the exterior of a pearl collar-button will be dissolved by perspiration and a plain, smooth surface remain. Corrosion is eating into pits and irregularities, and this action is seen to arise from the acid condition of the fluids of the mouth.

Dr. Andrews said that, according to Dr. Miller, decalcification must precede infection, and that decay of the tooth is a digestive ferment.

Dr. Sudduth said a change in the digestive fluids would give rise to an acid condition of the fluids of the mouth, but this will not act so as to form pockets; the action must be localized. If deposits of food are lodged about the teeth, the organisms always found in the mouth will digest the food if albumen or sugar; in the latter case lactic acid is formed, and this will form a pocket for decay. This is the only way in which it can originate. The essayist took the stand that the teeth in the pregnant woman are affected by the same process which brings about the softening of the bones. This cannot be true, as the histological construction is not the same.

Dr. Williams asked if the fluids of the teeth might not change with the other changed fluids.

Dr. Sudduth said the only way to take out the lime-salts from a bone or tooth is by the direct action of an acid. In the bone the cells called osteoclasts have the faculty of making an acid, but there is no analogous process in the teeth.

Dr. Williams said that the statement had been made by Dr. Goodale, of Harvard, that carious bone was brought about by the action of micro-organisms the same as in caries of the teeth.

Dr. Sudduth said he had not seen the statement. In necrosis of the bone it might be so, but he would not discuss it at present.

Dr. Williams. Dr. Sudduth says that nothing will decompose the lime-salts except an acid. This is just what I hold. The salivary acid begins the removal of the lime-salts, and the ferment acid continues it. I have patients who have started caries of their teeth by eating lemon-drops. I hold that the decay must start by the action of an acid.



Dr. Sudduth said he did not wish to quarrel with Dr. Williams's clinical experience. The only trouble was that the tooth had not been extracted and examined. There were cases where there were minute cracks or fissures through the enamel, too small to be easily seen, which admitted the micro-organisms of decay to the dentine below, and the caries might continue till a very considerable amount of the dentine was destroyed, and yet their existence not be suspected even by an ordinarily careful dentist. If now the enamel were removed by acid action, the decay would be apparent, and would be thought to arise from the acid which destroyed the enamel.

Dr. Marshall said he did not like one point made by Dr. Sudduth when he would have us believe that the tooth once formed and complete is like a piece of steel, without any nutritive or reparative change. He believes that there is a minute change in the enamel even, and a constant and considerable change in the dentine, and that under certain conditions of the system this nutrition is interfered with, resulting in softening of the dentine, which will be a predisposing cause of caries. The point he would make is that an acid condition of the oral cavity dissolves the enamel and forms a pocket for decay. He holds that the lactic-acid fermentation is the exciting cause of dental caries, and that it is augmented by the acid condition of the mouth; that after the enamel is abraded so as to form a lodgment the lactic acid in the mouth will cause the tooth to be more quickly and easily attacked. As a proof of the effect of disease on tooth-structure, he cited the effect of sickness on the teeth before they are erupted. The period of the sickness may be approximately determined by imperfections in the teeth. So any serious lowering of the system has an effect by decreasing the lime-salts in the teeth, making them more liable to injury, softer in texture, and more readily attacked by caries than at a time when the tone of the system was better.

Dr. Sudduth asked if he meant that analysis would show more lime-salts at one time than at another.

Dr. Marshall. There has never been any such analysis; but from analogy I should say it would be so. I believe that a tooth is nurtured all through life. We all know that the teeth of children are soft, and grow hard as the child grows older. This shows that lime-salts are added by the circulation in the tooth, and I believe that they can be taken out by the same circulation.

Dr. Williams. We do not know how the teeth are made softer by disease and their natural hardness restored again, but observation teaches that these changes take place.

Dr. E. S. Talbot read a paper entitled "Statistics of Constitutional

and Developmental Irregularities of the Jaws and Teeth of Normal, Idiotic, Deaf and Dumb, Blind, and Insane Persons."\*

Dr. Sudduth said it would strengthen the paper if the cause of the affliction in each case could have been stated, especially the cases of idiocy. Some cases are congenital or inherited, some are the result of disease or accident. Of course the latter, especially if the accident or disease occurred after the teeth were developed, could not have any effect upon them. Then many cases of idiocy, as well as of blindness or deafness, were brought on by a rachitic condition, which in turn originated in inherited syphilis. These cases were most generally found in cities, and there is no question but this rachitic condition predisposes to irregularity and lack of development.

Subject passed, and section adjourned at 4.30.

### THIRD DAY.

The section met at 9.30 A.M. Dr. W. W. Allport in the chair.

Dr. Sudduth exhibited a series of views by means of an improved lantern, to illustrate the processes of development of the teeth and other growths. His first view showed a section of the fetal jaw, magnified four thousand diameters. This was the first of a series showing the progress of development of the tooth. Afterward he showed the successive stages in the development of a hair. Dr. Sudduth said in regard to the origin of these organs that all life begins in a cell and consists of an aggregation of cells; each cell has in it the tendency to develop into some particular form, and what direction or form it will develop into cannot be determined by its position or appearance. We cannot tell whether any particular cell or collection of cells, by their appearance under the microscope, will develop into a horn, a hair, a gland, a nail, or a tooth.

(As Dr. Sudduth's remarks were made in the way of explaining the views, they cannot be reported to any advantage in the absence of illustrations. The views were very highly appreciated by those who saw them, and gave exceedingly good ideas of the minute anatomy of the dental embryo.)

Dr. Sudduth was followed by Dr. R. R. Andrews with a series of views showing fissures through the enamel of teeth and the part that such fissures bore in the process of caries. Dr. Andrews also read a paper entitled

### THE PITS AND FISSURES OF THE ENAMEL,

of which the following is an abstract:

The subject to which I call your attention this morning is one

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\* This paper was published in the July number of the DENTAL COSMOS, page 510.

more or less familiar to us,—the interruption of the continuity of the enamel-cap, and the causes which lead to it. Most authorities have given these imperfections their attention. Hunter speaks of them as cracks on the hollow parts of the grinding-surfaces of the molars, filled with a black substance; Fox, writing in 1803, describes them as irregularities of the grinding-surface of the molars, that lead into a cavity in the center of the tooth. During the progress of the decay, it is under this fissure in the internal part of the crown that we find the dentine soonest removed, causing the tooth to appear as if the inside had been scooped out; the enamel being so much harder than the bone remains, and only breaks away as it loses its support from the bony part becoming dissolved. The chief predisposition to this disease consists in a defective formation in either the enamel or the bony part of the teeth. This original defect in the structure of the teeth, he considered, must depend upon a want of healthy action in the pulps during the time of their formation. He did not attempt to account for this imperfection, but observed that the same kind of structure was to be found in the teeth of many individuals in the same family, who in all other respects were healthy. He believed that the teeth acquired this disposition to decay from some want of healthy action during their formation, which was proven by their becoming decayed in pairs. He asserted that in some of the teeth the decay was seen to proceed from the interior to the exterior part.

In 1835, William Robertson, of Birmingham, England, published a remarkable work entitled "A Practical Treatise on the Human Teeth," showing the cause of their destruction and the means of their preservation. In this work he probably gave more attention to the subject of pits and fissures than any other writer since his time, with the possible exceptions of Magitot and Wedl. He examined attentively those peculiar imperfections at which each of the several teeth are most liable to the beginnings of decay. He recognized that it never occurred on clean and smooth surfaces, but that in all instances the attack was made at such points as collect and retain the food until fermentation takes place, as in the interstices between the teeth and in pits and fissures in the enamel. He denied in toto Fox's assertion that the decay in any case proceeded from the interior to the exterior. He was the first writer to tell us that all decay is the result of chemical action, and believed that the pits and fissures so often found in the enamel, particularly upon the surfaces of the grinding teeth, were the principal cause of their destruction; that it was to this irregularity of structure, so peculiar to the molars, that their greater tendency to decay was to be attributed, and the liability in different individuals to decay of the



teeth was in proportion to the form and depth of these fissures; that as the enamel was completed, and the secreting membrane removed previous to the tooth appearing above the gum, no other change could take place in the structure of this substance, nor could it be affected by constitutional diseases or changes; and that therefore the durability of the teeth or their predisposition to decay depends upon the state of the constitution at the period of life when the enamel is being formed. The enamel of the teeth is universally acknowledged to be inorganic, and can only be acted upon chemically. Therefore when a tooth has appeared above the gum we can readily ascertain whether it is or is not predisposed to decay by examining the structure of the enamel. It will be found that the rapidity of chemical action and the ultimate destruction of the tooth will be in proportion to the form of the fissures and their capability of retaining extraneous matter.

Goddard (1843) speaks of the fissures thus: "The process of decay here is exceedingly insidious, in consequence of the original opening in the enamel maintaining its primitive size until great destruction of the ivory has taken place beneath it, when it suddenly breaks in, and a large cavity is found where a few hours before none was suspected."

Kelly (1843) tells us that decay commences in the body—dentine—of the tooth, directly beneath the enamel, and is therefore called internal decay. It is not, however, always produced by internal or constitutional causes. Internal decay is not strongly marked in the molars at all ages. It commences beneath a fissure on the outside of the tooth. A black or bluish spot is at first observed, which increases in proportion to the superficial nature and extent of the disease, till a great part of the outside of the tooth is discolored. In a still greater number of cases the disease takes a direction toward the center, disorganizes the spongy bone of the tooth, and possibly precludes all hope of its preservation, before the enamel even cracks. In a third variety the disease burrows for a longer or shorter time so far within the crown of the tooth as to give little or no external indication of its true condition. The bicuspid are liable to similar attacks under their grinding-surfaces, and with the same results. The upper incisors occasionally begin decay at a natural though imperfectly formed concavity, directly in the center of their inner surfaces, but when the enamel is entire we have reason to believe they never decay at this point. Those who argue that the constitution has but little to do with the teeth suppose that a fissure can always be found over the point where this variety of decay occurs, and hence the only exciting causes are outward and accidental. Allowing this defect to exist, it must be admitted, for

it is proof itself, that the constitutional powers were originally unequal to the perfect organization of the tooth, and, consequently, its powers of resisting destructive agents are below the natural standard, which in the teeth are, at best, lower than in other parts of the system. It is obvious, then, that when any modification of the general health, or any local causes, dispose the teeth to decay, it will be seated where they are least protected on their surfaces in the fissures.

Tomes says molars and bicuspid may present to the naked eye all the appearances of well-developed organs, and yet the enamel may be imperfect, and the imperfection may be in such a form as to insure the early loss of the tooth. From the natural depressions which separate the cusps of molars, minute but deep fissures may be extended through the enamel to within a short distance of the dentine, and they may become larger as they recede from the surface of the tooth. In most cases which he has examined they have been filled with cementum, or rather with that modification of cementum which constitutes Nasmyth's membrane, and very commonly they become the seat of decay. These minute crevices, the existence of which, in many teeth, on ordinary examination would not be suspected, are constantly met with in connection with these forms of defective enamel. He claims that in the foremost rank, as a predisposing cause to decay, must be placed these deep but minute fissures found upon the masticating surfaces of the molars and bicuspid.

Salter (1875) taught that the defects in the enamel between the cusps of molars and bicuspid are common and fruitful of destructive disease. The fissures are frequently deep, and at the bottom there exists only a confused, ill-developed enamel that is cracked and porous, affording a most incomplete protection of the dentine from external influence. Depressions on the enamel sometimes occur in unusual positions, giving rise to similar results. Perhaps the most common of these occurs at the back of the superior incisors,—a pretty sure cause of decay in that situation. These predisposing causes practically leave the surface of the dentine open to the attacks of the fluids of the mouth. Where the defects are only superficial, the enamel itself may alone first suffer. He claimed that the tissue under imperfectly formed enamel is always more or less faulty in structure, and that imperfect calcification of dentine is in itself a predisposing cause of decay.

Wedl says that cracks or fissures in the enamel—interruptions of continuity—are observed very frequently upon the otherwise healthy, sound teeth of young persons. Upon close inspection by means of a lens, they are found to be much more numerous than

one would suspect. In order to obtain a definite idea of the appearance of the enamel-cap when it presents fissures or carious spots, it is advisable to detach the cap by means of a fifty-per-cent. solution of sulphuric acid. In this way a clear and definite view of the fissures may be obtained. It may readily be shown that when the pigment-deposit consequent upon decay is limited to a scarcely perceptible dark brown minute dot upon the masticating surface it is much more extensive upon the internal or dentinal surface, where it has a roundish or jagged outline. When decay in the groove of a molar is displayed in the form of a very narrow streak containing pigment, the affected portion upon the internal surface of the cap measures a fourth of a millimeter and upward. Wedl speaks also of finding undermining decay in the substance of the enamel,—where the particles of enamel have crumbled away and are detached, leaving a gap, or a pit, which increases in extent in the deeper layers of this tissue. I have quite a number of examples of this undermining decay of the enamel in my own collection.

Magitot (1870), writing of congenital imperfection of structure, said that the external imperfections, whose forms vary infinitely, consist most commonly of vices of conformation of the enamel layer,—dark-colored, irregular grooves on the masticating faces of molars and bicuspidis; fissures which the finest probe penetrates with difficulty. They approach more or less near the dentine, and sometimes actually reach it and expose it. All their characteristics resemble closely decay of the first degree. They are exclusively due to intrafollicular disturbances of their dentification. Now, these disturbances, when they occur, ought necessarily, owing to the law which governs them, to be produced simultaneously, and in the same degree, in all the teeth which are at the same moment in the process of dentification. This is in fact what happens, and here is found the explanation of identical congenital lesions upon homologous teeth, and consequently of decay which has the same relative position. It is not then surprising to see two molars, for example, or two incisors on opposite sides of the same jaw, presenting the same fissure, the same crevice, the same congenital cavity, and in consequence one position, one progress, and one identical form of two parallel cases of decay.

Dr. G. V. Black states that the occurrence of decay in fissures and pits is dependent principally on the opportunity given for fermentations at these points by the depth of the pits and fissures in the several teeth, modified by the individual predisposition to decay. In the child this may be inferred after having learned the condition of the teeth of the parents. The enamel in this position is very thick and heavy, and the pit or fissure often penetrates it more or



less completely, so that the decay apparently does not begin on the outside, but in the depths of the pit, from which it spreads under the strong enamel to a considerable extent, and often penetrates the dentine deeply before giving any sign, especially in children, where the dark color is not present as a warning. It is often shown by an ashy gray color seen through the enamel. This type of decay appears very soon after the eruption of the teeth; in the permanent teeth usually in the first molars. These cavities occur in about twenty-five per cent. of first molars, or an average of one to every patient who applies for a dental operation. My own experience teaches me to believe that this percentage is considerably under what it should be. Dr. Black's statement that the pits are very often absent in bicuspid and incisors is not in accord with my experience. I find that they are almost as constantly present in the bicuspid as in the molars.

There are some characteristics of this form of imperfectly developed structure that have interested me while studying its appearance under the higher powers of the microscope,—the appearance of the fissures in the enamel and of the dentine immediately within. These interruptions to the perfect formation of the tissues are, I think, very largely a result of inherited tendencies, although it must necessarily be difficult to ascertain with certainty whether it may not have been accidentally caused, subsequent to birth. We are almost certain to find a tract of imperfectly developed dentine under a deep fissure, and I believe this to be the real cause of the formation of the fissure itself. Thus, a deep fissure found in a recently erupted tooth is a certain sign of a tract of badly organized and softened dentine within, which may or may not be infected with micro-organisms. The delicate point of an exploring-needle demonstrates that the dentine is nearly or quite exposed. A fissure-drill pressed through this enters apparently normal dentine; a little deeper, sometimes considerably deeper, drilling reaches a softened and sensitive tract of poorly organized tissue. In examining sections of this class of teeth we find this poorly organized tract to be made up largely of globules of calcified matrix, and the spaces between them are filled with a partially calcified substance sometimes called interglobular substance, but which is really calco-globulin. The globules are seen to be a mass of transparent spherical bodies of various sizes, and they are very numerous under the fissures,—so numerous that they inclose jagged spaces called interglobular spaces. In a developing tooth calco-globulin is found everywhere on the edge of the calcified dentine, between it and the organic pulp. I have often noticed it in globular formation, though it is usually in a smooth layer. The globular formation may have been some pathological

interruption in the regular process of development, or it may have represented a primary stage in the formation of the dentinal tissue. I am not as yet sure which. It is possible that an inherited tendency, or any interruption in the normal process of tooth-evolution, might cause the dentine to assume this primary or imperfect globular structure. The spaces are soft, like cartilage, and when the mass is pressed with an excavator, or other instrument, it yields, disturbing large numbers of fibrils that are in the mass, causing considerable pain. The existence of these interglobular spaces can be regarded with certainty as a condition predisposing them to decay, and when these spaces become invaded by infection the decay will necessarily be rapid. Teeth having these characteristics are usually larger than teeth of the ordinary size; their faces are rough and irregular, with protuberances rising not only from the grinding-faces of the bicuspid and molars, but often from their sides, with deep fissures between them. Their color is usually a muddy white. The palatine surfaces of the incisors and cuspids also have these fissures. They usually decay rapidly, and in some cases nearly set at defiance the resources of the dentist. Other classes of teeth having this same interruption are found to be uncommonly long, of a bluish appearance, the incisors thin and narrow and the cuspids much pointed. The bicuspid and molars are small in circumference, and have deep fissures upon their grinding-surfaces. They have a soft, chalky texture, and the decay is usually light-colored and rapid. Pits and fissures are by no means confined to this class of teeth. In teeth of far better quality fissures, cracks, and pits in the enamel are commonly found. They are between the cusps, more often upon the prominence of the cusps (here in the form of pits) and upon the approximal surfaces of the teeth.

Some of these probably have their origin from accidental causes. On the prominences of the cusps the pits are often found to lead into what are called undermining caries of the enamel; that is, a place where decay is more extensive in the deeper layers than is apparent upon the surface. The pit leads here into a decayed spot, where the particles of decomposed enamel within the cavity have crumbled away, forming a decayed place. These are more frequent than is generally supposed. Sometimes the pit is a dark spot which leads into this cavity, and sometimes it is light and difficult to see. It can usually be detected in teeth which are examined by a mirror, where light is transmitted through them, when it appears as a gray or brownish spot within the enamel. Although the cavities of decay are at first within the substance of the enamel, they rapidly enlarge and expose the dentine, when infection follows. Cracks are often found on the approximal surfaces of poorly

organized teeth. They lead into a decayed tract of the dentine, which is separated from the enamel by the decay, and is in color a yellowish brown. The tubuli everywhere against the decayed portion are found to be full of micro-organisms, gas-bubbles, and granules. These extend in a dark tract nearly to the pulp, looking as tubules do macroscopically in dried sections, when they are full of air. On other sections where pits are found upon the prominences of the cusps, dark brown tracts running through the enamel to the dentine are seen. The tubes near this tract are found to be discolored and infected. This line of infection runs into the substance of the dentine in the direction of the tubuli, and nearly to the pulp. Between it and the pulp, however, there is a lighter layer of tissue, which may be caused either by the resistance of the pulp to the inroads of infection, or may be an uninfected decalcified layer, caused by the acid given off by the infection. Where a section of the recently infected tooth has not been specially prepared by staining to show the organisms, the infected tubes have in them minute bubbles of gas which look like micrococci. Some of the bubbles join together like little rods, having the appearance in photo-micrographs of bacilli, and may easily be mistaken for such. Their origin is probably in the action of an acid on the lime-salts of the dentine. This acid is given off as a waste product by the organisms, and is everywhere present in early infected dentinal tubes. It has the appearance of what Prof. Miller has described as broken pipe-stems in the dentine, but I do not think it is the same thing. By staining the tissue, it is an easy matter to prove that these gas-bubbles are not micro-organisms. I have frequently seen them unstained in sections of carious dentine in which the micro-organisms present were stained a deep red. In all specimens of stained, early-infected dentine, these bubbles of gas are present in large numbers. Cracks are often found to be present in the enamel on the approximal surfaces of the bicuspid and molars near the neck, which lead into the dentine. I have reason to believe these are more numerous than we suppose them to be, and that they are the cause of much of the approximal decay. Where the dentine within its substance is faulty, as in the cases I have already mentioned, these cracks may be the source of infection equally with the fissures in the crown. Dr. George S. Allan, of New York City, is the only writer that I now recall who has called especial attention to these defects, in this location, although Wedl may have mentioned them. Dr. Allan says that calcification commencing on the prominences of the cusps gives rise to as many points of calcification as there are cusps. When they meet, from some unknown cause, these cusps do not always unite. Among other places, faults of this



kind are found on the cervical portion of the enamel, midway between the buccal and palatal faces. They differ from those found on other portions of the tooth, in that they resemble more closely an ordinary crack, that might have been caused by mechanical force or desiccation. I can attest to the correctness of Dr. Allan's assertion by sections made across this portion of bicuspid. These show crevices or cracks through the enamel in width sufficient to admit of infection by any of the micro-organisms found in decayed teeth.

The chairman announced the receipt of a telegram from Dr. Friedrich Busch, of Berlin, Germany, which said that arrangements had been made for a dental section in the International Medical Congress to be held in Berlin in 1890. The section returned reply of congratulation, and pledged the support and co-operation of the Dental and Oral Section of the American Medical Association and of the dentists of America.

The committee appointed to draw up resolutions on the death of Dr. Rehwinkel reported as follows :

*Resolved*, That the members of the Dental and Oral Section of the American Medical Association desire to express their sorrow at the loss by death of the chairman of the section, Dr. F. H. Rehwinkel, of Chillicothe, O., and to place on record their high appreciation of his character as a zealous and learned scientist, a skillful practitioner, and an honorable man in every walk in life.

The section then adjourned to meet at Nashville, Tenn., in 1890.

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## NATIONAL ASSOCIATION OF DENTAL FACULTIES.

THE sixth annual session of the National Association of Dental Faculties was held in the Town Hall, Saratoga Springs, N. Y., commencing Monday, August 5, 1889, at 10 A.M.

The Executive Committee reported that credentials had been received in accordance with the resolution adopted last year from the following colleges :

Chicago College of Dental Surgery, Truman W. Brophy.  
Indiana Dental College, J. E. Cravens.  
State University of Iowa, Dental Department, A. O. Hunt.  
New York College of Dentistry, Frank Abbott.  
Boston Dental College, J. A. Follett.  
Harvard University, Dental Department, T. H. Chandler.  
Ohio College of Dental Surgery, H. A. Smith.  
University of Pennsylvania, Dental Department, James Truman.  
Baltimore College of Dental Surgery, R. B. Winder.  
Dental Department of Southern Medical College, L. D. Carpenter.  
Vanderbilt University, Dental Department, W. H. Morgan.

University Dental College, J. S. Marshall.

Missouri Dental College, W. H. Eames.

Kansas City Dental College, J. D. Patterson.

Dental College of University of Michigan, J. Taft.

Subsequently credentials were received from Pennsylvania College of Dental Surgery, represented by C. N. Peirce; Harvard University, Dental Department, Thos. Fillebrown; and Louisville College of Dentistry, J. Lewis Howe.

Columbian University, Dental Department, represented by J. Hall Lewis, and University of Maryland, F. J. S. Gorgas, were elected members of the association. The application for membership of Royal College of Dental Surgeons of Ontario was reported favorably, but the Executive Committee expressed a doubt as to the propriety of admitting it owing to the title of the association, which would seem to confine membership to colleges in the United States.

Applications from American College of Dental Surgeons, Chicago, College of Dental Surgery of the University of Denver, and College of Dentistry, Department of Medicine, University of Minnesota, were laid over one year under the rules.

After a long discussion, the association adopted by a vote of twelve to six a rule requiring attendance upon three full regular courses in separate years before examination for graduation. By a vote of eighteen to one the length of the regular courses was made "not less than five months each."

The time when the new rules shall go into effect was, on motion of Dr. Truman, fixed at the beginning of the session of 1891-92. It was also ordered, on motion of Dr. Patterson, that the resolutions requiring attendance on three terms be published in the announcements of the various colleges for the session of 1890-91.

A committee, consisting of Drs. Truman, Taft, Cravens, Brophy, and Howe, was appointed to take into consideration the equalization of college fees. The committee subsequently reported a partial tabulation of fees, with a recommendation that the minimum fees be fixed at \$100 a year. The report was laid over under the rules and the committee continued.

Drs. Cravens, Marshall, and Patterson were appointed a committee to codify the rules and report next year.

Dr. Fillebrown, from the committee appointed to consider the request of the Baltimore College of Dental Surgery with reference to the granting of the degree D.D.S. to a prominent practitioner without attendance upon lectures, reported in favor of declining the request. The report was accepted.

On motion of Dr. Gorgas, amended by Dr. Brophy, it was ordered that the colleges of this association print the list of their matricu-

lates at the previous session, with the States or countries from which they come, in their annual announcement, with an asterisk (\*) opposite the names of those not in attendance and a foot-note stating the fact.

On motion of Dr. Truman, it was ordered that colleges making application for membership be notified by the secretary that it will be necessary for them to appear by representative before the Executive Committee.

Dr. Marshall offered the following, which was adopted :

*Resolved*, That all applications for membership reported upon favorably by the Executive Committee shall lie over one year before final action may be taken thereon.

Dr. Abbott offered a resolution requiring colleges of this association desiring to confer the honorary degree, to submit the names of the persons so to be honored to this association for approval. Adopted.

The Committee on Text-Books reported that the work recently published by Dr. Fillebrown had not been submitted to the committee for approval. The report was accepted.

The committee also reported that they had examined the work on "Orthodontia" compiled by Dr. S. H. Guilford, and they recommended that it be adopted as a text-book. The report was accepted.

On motion of Dr. Truman, the work on "Dental Chemistry," by Dr. Clifford Mitchell, was accepted formally as a text-book.

The following resolutions were laid over under the rules :

Offered by Dr. Brophy :

*Resolved*, That graduates in medicine who have not had at least two years' practice in operative and prosthetic dentistry shall be required to attend the lectures and engage in the practice-work in these departments during two annual sessions previous to admission to the examinations for the dental degree.

Offered by Dr. Patterson :

*Resolved*, That after the session of 1891-92 a diploma from a reputable medical college shall entitle its holder to enter the second course in dental colleges of this association, but shall not entitle him to an entrance into the senior class.

The following officers were elected for the ensuing year :

James Truman, president ; L. D. Carpenter, vice-president ; J. E. Cravens, secretary ; A. W. Harlan, treasurer ; Frank Abbott, J. Taft, and F. J. S. Gorgas, executive committee.

The following committees were appointed : *Ad interim* committee, Drs. T. W. Brophy, R. B. Winder, and J. A. Follett ; Committee on Schools, Drs. H. A. Smith, J. D. Patterson, J. Lewis Howe, W. H. Morgan, W. H. Eames.

Adjourned to meet at the call of the Executive Committee.



### NATIONAL ASSOCIATION OF DENTAL EXAMINERS.

THE National Association of Dental Examiners held its eighth annual session in the Town Hall, Saratoga Springs, N. Y., commencing Tuesday, August 6, 1889, at 1 o'clock P.M.

The following State boards of examiners were represented: Illinois by C. R. E. Koch; Ohio, J. Taft, H. A. Smith; New Jersey, F. A. Levy, J. G. Palmer; Indiana, S. T. Kirk; Maryland, T. S. Waters; Massachusetts, L. D. Shepard, J. S. Hurlbut; Vermont, Geo. H. Swift, James Lewis; Delaware, C. R. Jefferis, T. H. Gilpin; Colorado, P. T. Smith; Georgia, A. G. Bouton.

Delaware and California were admitted to membership.

Drs. Jefferis, Shepard, and Koch were appointed a committee to consider a mass of correspondence with reference to the standing of a college whose name had been omitted from the list of colleges whose diplomas were recommended to be received by the State boards. This committee was afterwards constituted the Committee on Colleges.

The committee at a later session reported, recommending that the secretary be instructed to inform the Dental Department of St. Louis College of Physicians and Surgeons that owing to insufficient information the association is unable to take final action on its application for recognition; and sustaining the action of the officers in omitting the name of the University of Maryland, Dental Department, from the printed list of recognized colleges last year. The report was received and adopted unanimously.

The committee also reported the following list of colleges which may be recommended as reputable by this association:

- American College of Dental Surgery, Chicago, Ill.
- Baltimore College of Dental Surgery, Baltimore, Md.
- Boston Dental College, Boston, Mass.
- Chicago College of Dental Surgery, Chicago, Ill.
- College of Dentistry, Department of Medicine, University of Minnesota, Minneapolis, Minn.
- Dental Department, Columbian University, Washington, D. C.
- Dental Department of Northwestern University, Chicago, Ill.
- Dental Department of Southern Medical College, Atlanta, Ga.
- Dental Department of University of Tennessee, Nashville, Tenn.
- Harvard University, Dental Department, Cambridge, Mass.
- Indiana Dental College, Indianapolis, Ind.
- Kansas City Dental College, Kansas City, Mo.
- Louisville College of Dentistry, Louisville, Ky.
- Minnesota Hospital College, Dental Department, Minneapolis, Minn. (Defunct.)
- Missouri Dental College, St. Louis, Mo.
- New York College of Dentistry, New York City.
- Ohio College of Dental Surgery, Cincinnati, O.

Pennsylvania College of Dental Surgery, Philadelphia, Pa.  
Philadelphia Dental College, Philadelphia, Pa.  
School of Dentistry of Meharry Medical Department of Central Tennessee College, Nashville, Tenn.  
St. Paul Medical College, Dental Department, St. Paul, Minn. (Defunct.)  
University of California, Dental Department, San Francisco, Cal.  
Northwestern College of Dental Surgery, Chicago, Ill. (Defunct.)  
University of Iowa, Dental Department, Iowa City, Ia.  
University of Maryland, Dental Department, Baltimore, Md.  
University of Michigan, Dental Department, Ann Arbor, Mich.  
University of Pennsylvania, Dental Department, Philadelphia, Pa.  
Vanderbilt University, Dental Department, Nashville, Tenn.

The committee recommended also that the standing Committee on Colleges be instructed hereafter to take cognizance of and investigate all charges against any college, that they give the accused an opportunity for defense, and that they report a revised list of colleges at each annual meeting after having investigated all complaints; and that this same committee also have authority to inquire into the proper equipment and organization of colleges not now on our list, so that they may be able to report as to the capability of such institutions to give acceptable instruction, both as to the quality and quantity of its teaching.

After hearing the representative of the College of Dental Surgery of the University of Denver, Dr. P. T. Smith, that institution was added to the list, and the report was then adopted.

Dr. Koch offered resolutions that it is the sense of this association that no one should be permitted to assume the responsibilities of a dental practitioner until he shall have had at least three years' previous study and instruction, inclusive of three full terms of not less than five months each, in a properly organized and equipped dental college, provided that time spent in the study of medicine or graduation from a medical college may be credited on this requirement not to exceed the period of two years or two full terms of collegiate instruction; and recommending to such State boards of dental examiners as are by the laws of their respective States required to issue licenses to practice dentistry to all holders of diplomas from reputable dental colleges that they make such rules as shall require all colleges to make three full calendar years of study and the attendance upon three full college terms of not less than five months each a prerequisite to graduation; and that only such colleges as shall comply with this rule on or before the beginning of their scholastic year of 1890-91 should thereafter be considered as reputable; and that all State boards should, when their State laws permit the same, decline to grant a license to practice to any one who cannot produce evidence showing that he has spent at least three full years in study

and preparation before attempting to assume the responsibilities of a dental practitioner.

Referred to a committee consisting of Drs. Kirk, Palmer, and Bouton, with the information that the National Association of Dental Faculties had adopted a rule to go into effect at the session of 1891-92 requiring attendance upon three full regular courses before examination for graduation. The committee reported recommending that the portion "relating to States where an examination is held and license granted be approved." The report was adopted.

Dr. Koch moved that the secretary be instructed to publish a notice in the dental journals informing all dental colleges not now recognized as reputable by this association that in order to be enrolled upon the list of colleges recognized by it it will be necessary for such colleges to apply for recognition and show that their workings are such as to entitle them thereto. So ordered.

Dr. Shepard moved to make the standing Committee on Colleges consist of five members, whose duty it shall be to report annually upon the colleges entitled to recognition. So ordered.

The following officers were elected: T. S. Waters, Baltimore, president; C. R. E. Koch, Chicago, vice-president; F. A. Levy, Orange, N. J., secretary-treasurer. The president appointed as the Committee on List of Reputable Dental Colleges Drs. L. D. Shepard, C. R. E. Koch, C. R. Jefferis, F. A. Levy, and S. T. Kirk.

Adjourned to meet at the time and place of the next meeting of the American Dental Association, at 9 A.M. of the first day.

### COLORADO STATE DENTAL ASSOCIATION.

THE third annual meeting of the Colorado State Dental Association was held in Denver, June 26 to 28, 1889, at the rooms of the dental department of the University of Denver.

The president, Dr. J. W. Grannis, in the chair.

The following essays were read: "Surgical Treatment of Abscess," J. M. Porter; "Cocaine applied to Dentistry," Geo. J. Hartung; "Alveolar Abscess without Fistula," W. A. Smith; "Microbes," P. T. Smith; "Preparation of Compound Cavities," H. A. Fynn; "Exposed Pulp," J. N. Chipley; and "Dietetics," Wm. Smedley.

Clinics were given by S. Davis, fusing bands to crowns; M. A. Bartleson, bridge-work; J. W. Grannis, gold filling; W. E. Griswold, anchoring bridge-work. Dr. F. A. Twitchell exhibited his new oxyhydrogen blow-pipe, using gasoline and nitrous oxide, producing an intense heat, particularly useful to those dentists not having gas in their laboratories. The Denver Electric Motor Company displayed a device connecting the dental engine hand-piece and arm with the Wooley electric motor.



The officers elected are: J. M. Porter, president; M. H. Smith, first vice-president; G. W. Milton, second vice-president; H. P. Kelley, secretary and treasurer; Chas. F. Dodge, corresponding secretary. Dr. P. T. Smith was elected a delegate to the American Dental Association.

Thirty-nine new members were enrolled.

CHAS. F. DODGE, *Cor. Secretary*,  
Leadville, Colorado.

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#### MINNESOTA STATE DENTAL ASSOCIATION.

THE sixth annual meeting of the Minnesota State Dental Association was held at the Spalding House, Duluth, July 10, 11, and 12, 1889. The officers elected for the ensuing year were: G. V. I. Brown, president; L. C. Davenport, vice-president; C. H. Robinson, recording secretary; M. G. Jenison, corresponding secretary, and H. M. Reid, treasurer. The next annual meeting will be at Minneapolis, commencing the second Wednesday in July, 1890.

M. G. JENISON, *Corresponding Secretary*,  
No. 608½ Nicollet avenue, Minneapolis, Minn.

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#### NORTH CAROLINA STATE DENTAL ASSOCIATION.

AT the meeting of the North Carolina State Dental Association at Greensboro, June 25 to 27, 1889 (a report of which appeared in our last issue), the following officers were elected for the ensuing year: Sid. P. Hilliard, president; Geo. W. Whitsett, first vice-president; Will J. Conrad, second vice-president; H. C. Herring, secretary; J. W. Hunter, treasurer; C. A. Rominger, essayist.

H. C. HERRING, *Secretary*, Concord, N. C.

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#### HAYDEN DENTAL SOCIETY OF CHICAGO.

THE Hayden Dental Society of Chicago was organized and incorporated under the laws of the State of Illinois, August 3, 1889.

The object of the society is the professional and social improvement of its members. Meetings will be held in Chicago on the third Monday of each month (except July and August).

The following officers were elected for the ensuing year: Louis Ottofy, president; A. W. Freeman, vice-president; A. J. Oakey, secretary; J. W. Rogers, J. L. Ubellar, and H. P. Smith, board of directors.

A. J. OAKEY, *Secretary*.

## UNIVERSITY OF MARYLAND, DENTAL DEPARTMENT.

At the annual meeting of the National Association of Dental Faculties, held at Saratoga, August 5, 1889, the Dental Department of the University of Maryland became a member of that association, and subject to all the rules and regulations in regard to dental schools adopted by that body.

FERDINAND J. S. GORGAS, *Dean*.

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## NORTHERN ILLINOIS DENTAL SOCIETY.

THE Northern Illinois Dental Society will meet at Sterling, Ill., on Wednesday and Thursday, October 16 and 17, 1889.

T. W. BECKWITH, *Secretary*,  
Sterling, Ill.

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## ILLINOIS STATE BOARD OF DENTAL EXAMINERS.

THE Illinois State Board of Dental Examiners will meet on Monday, September 16, 1889, in the State House at Springfield, at 10 o'clock A.M. Candidates for examination will present themselves before 2 P.M. of that day.

C. STODDARD SMITH, *Secretary*,  
103 State street, Chicago.

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## EDITORIAL.

## THE AMERICAN DENTAL ASSOCIATION.

THE recent meeting of this association was the least interesting and generally the least valuable of any session of that body for several years. The attendance was smaller than usual, and the sessions were rendered much less interesting than they otherwise would have been, by the absence of the members of the National Association of Dental College Faculties and the National Board of Dental Examiners, whose sessions were held at the same hours as those of the association. This was a serious mistake, and as it was so recognized it is not probable that it will be allowed to occur in the future.

The Sections had not made preparation at all adequate to that which had been accomplished for previous sessions, and, with one exception, and a single paper in another Section, there was little to indicate that due efforts had been made for a creditable presentation of the subjects embraced in the several departments assigned to the respective Sections.

It is to be noted with approval that the routine business and discussions were characterized by a commendable friendliness of spirit and deportment.

Considerable disappointment was experienced, especially by the younger members, on account of the fact that there were no clinical demonstrations whatever during the meetings,—a feature which has added very much to the practical value of previous meetings.

No procedure of the recent meeting was so prophetic of future benefit as the resolution providing, as a condition of college representation in the association, a three-years' course of study; the separate but concurrent action of the National Association of Dental College Faculties and of the National Board of Dental Examiners giving it the required emphasis. We reproduce the resolution of the association in this connection:

*Whereas*, The National Association of Dental College Faculties has passed a resolution adopting a three-years' course of instruction after matriculation as essential to graduation, therefore

*Resolved*, That in the future no dental college shall be represented in this association that does not comply with the course of instruction adopted by the college association named.

It is of happy augury that the national representative body, the State boards, and the college faculties are accordant in a measure so fundamental and so vital, and we congratulate alike the association, the profession in general, and the public at large upon the progress of dental science and art which is thus assured.

The association gave cordial sympathy and promised support to the Dental Protective Association of the United States, commending its object to every member of the profession.

The report of the meeting, the papers, and discussions will appear in successive numbers of the DENTAL COSMOS.

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### THE LICENSE QUESTION IN COURT.

WE copy the following item from the New York *Times* of July 27, 1889. The question thus opened is one that will interest the dental and medical professions throughout the country:

In the cases of a physician and a dentist indicted for practicing medicine and dentistry without a license, the Supreme Court of New Hampshire yesterday quashed the indictments and declared the law requiring a license for the practice of medicine and dentistry unconstitutional.



## BIBLIOGRAPHICAL.

A PRACTICAL TREATISE ON ARTIFICIAL CROWN- AND BRIDGE-WORK.  
By GEORGE EVANS. Second edition, revised and enlarged. With  
547 illustrations. Octavo, pp. 291 and index. Philadelphia: The  
S. S. White Dental Mfg. Co., 1889. Price, \$3.00.

Although less than a year has elapsed since the publication of the first edition and the second being called for, a revision of the work became necessary in order to fulfill the requirements of a thoroughly practical and comprehensive treatise. A considerable rearrangement of the text, the addition of two new chapters of thirty pages of new matter, and forty-seven additional cuts, will be found in the present edition. The volume was noticed on its first appearance in the October (1888) number of the DENTAL COSMOS, and we copy from that, with added emphasis, the following indorsement: "To say that the subject has been well and conscientiously presented is but partial justice, for not only has the whole ground been covered, but, what is of almost equal importance, the author has treated his subject with a clearness and directness which leave nothing to be desired. The impression received upon reading the book is that it is the work of one who is not only practically familiar with his subject, but has in addition that rare quality, the ability to tell clearly what he knows about it. The volume should be placed upon the list of standard text-books of the dental colleges, as well as in the hands of every practitioner who desires to be informed upon the elaborate developments in this interesting field of prosthetic dentistry."

DE LA PROTHÈSE IMMÉDIATE APPLIQUÉE A LA RÉSECTION DES MAXILLAIRES. RHINOPLASTIE SUR APPAREIL PROTHÉTIQUE PERMANENT. RESTAURATION DE LA FACE, LÈVRES, NEZ, LANGUE, VOUTE ET VOILE DU PALAIS. Par CLAUDE MARTIN, Médecin-Dentiste de l'École du service de Santé militaire, Officier d'Académie, Lauréat de l'Académie et de la Faculté de Médecine de Paris, de la Société nationale de Médecine de Lyon (Médaille d'or). Preface de M. le Professeur OLLIER, Membre Correspondant de l'Institut. Pp. 440, 8vo. 230 Figures dans le texte. Paris, 1889.

The most important section of this work is that devoted to an exposition of the author's system of immediate prosthesis applied to cases of resection of the maxillary bones. Heretofore the accepted method in such cases has been to await the full completion of the process of cicatrization before attempting the introduction of an artificial substitute for the resected osseous structures; such delay always resulting not only in great impairment of functional efficiency

in the remaining portions of the masticatory apparatus, and in interference with speech, but also in a disfigurement of the patient more or less considerable as the amount of bone removed has been great or small.

The system devised and practiced by Mr. Martin is, in brief, to make immediate prosthesis a part of the surgical procedure. If, for example, the greater portion of the body of the lower jaw is to be removed, measurements of the (as nearly as possible) normal shape and dimensions of the portion to be resected are made before the operation, and from these a provisional artificial jaw in hard rubber is constructed, care being taken to make it amply large for all possible contingencies.

The diseased bone being removed, the artificial jaw is immediately fitted in place and steadied in position by means of plates or flanges attached to its sides in such a manner as to grasp the remaining portions of the bone buccally and lingually, still greater stability being given by securing the flanges to the bone by means of screws. When this cannot be done, a plate is made for the upper jaw, to which plate the artificial jaw is attached by strong spiral springs. After the artificial jaw has thus been securely placed, the flaps made in the tissues of the face are drawn together and sutured in the usual manner.

In order to prevent the accumulation and retention of septic matter during the process of suppuration, the artificial jaw is channeled with a system of canals through which antiseptic fluids can be freely passed, thus washing away from around the jaw pus and all other offensive matter.

This provisional appliance is retained in position until cicatrization is fully accomplished and contraction of tissue has ceased. It is then replaced by a permanent artificial jaw made of the same material as the first. To facilitate its introduction and removal when very large, it is made in sections which can be securely fastened together in the mouth and can be removed and replaced by the patient at will.

To describe in detail all the ingenious devices by which these complex processes are simplified and rendered practicable and effective would require far more space than can be reasonably asked for in the reviewer's column. Such detail, indeed, can best be supplied by Dr. Martin's own lucid text.

In addition to maxillary prosthesis, the work contains much that is novel and ingenious in the making of obturators for defects of the hard and soft palate, and in labial and nasal prosthesis.

Artificial lips Dr. Martin makes in soft rubber, hollowed so that they can be filled, or partially filled, with water, the presence of

which fluid gives to them a firmness and resiliency resembling that of the natural organs. These water-pouches are also introduced along the margins of soft rubber vela, to give them a cushion-like quality under muscular contraction and thus more effectually seal the cleft.

In making an artificial nose the material preferred by the author is porcelain, fused upon a shell of very thin platinum carefully modeled to the face. The directions given as to the character of the porcelain base and the pigments necessary to secure the proper tone and color are not very definite. The author states that he uses kaolin, feldspar, etc., in different proportions, the proper proportions being difficult to obtain. He, however, recommends as applicable in a majority of cases Allen's "continuous-gum" body and enamels, the color and tone of the latter being modified by purple of Cassius, sponge-platinum, and precipitated gold, the latter being commended as specially necessary for the reproduction in the enamel of the translucency and animation of the living skin. To diminish weight the platinum shell is separated from the porcelain after the final baking, and to remove the glazed surface from the porcelain it is subjected to the action of hydrofluoric acid.

Dr. Martin's work is illustrated by many excellent wood-cuts, which furnish material aid to a comprehension of the text. A large number of photogravures also are given, showing the admirable results of immediate maxillary prosthesis in patients on whom the system has been practically tested. Cases of nasal and labial prosthesis also are similarly illustrated. In all of these scarcely a trace of deformity remains.

The success of Dr. Martin's methods is fully vouched for by so distinguished an authority as Prof. Ollier, one of the most eminent of living French surgeons, and this brief review can hardly be more fittingly closed than by reproducing here the concluding paragraph of Prof. Ollier's highly commendatory preface to the volume under consideration :

"Witness during fifteen years of the incessant efforts of M. Martin to perfect the prosthesis of the face, it gives me pleasure to present to the public the book which he to-day publishes. I recommend it all the more because the reading of the work will, I am persuaded, leave the impression of an upright spirit, conscientious and truthful, animated with the most ardent zeal for the progress of his art. Full of devotion for those operated upon in our hospitals, for whom he has always been prodigal of his time and trouble, M. Martin has won the high esteem of all the chiefs of service, who have found in him a collaborator as skillful as he is disinterested."



AIDE-MÉMOIRE DU CHIRURGIEN-DENTISTE. Par M. PAUL DUBOIS, Directeur de l'Odontologie, Président de la Société d'Odontologie de Paris. Professeur Suppléant de Thérapeutique Spéciale à l'École Dentaire de Paris. Deuxième Édition. Paris, 1889. 8vo, pp. 451.

The most interesting and valuable portion of this work is the section on the pathology and therapeutics of dental caries and those complications, such as exposure and devitalization of the pulp, inflammation of the peridental membrane, alveolar abscess, etc., which are the more usual immediate results of the carious process. In the preparation of this section the author has availed himself of the results of the most recent research and presented them in a clear, concise, and instructive manner.

The second part of the work is devoted to operative dentistry proper, this embracing methods of and materials for filling teeth; the introduction of artificial crowns; extraction of teeth, the accidents resulting therefrom; and the induction of local anesthesia for extraction. In this section, too, the matter is well arranged in a condensed form, and it is difficult to see how the subject could have been more thoroughly treated in so restricted a space.

The engravings, although necessarily few in number, are well selected. It is to be regretted, however, that the designer of the illustration has not in all cases been credited with his work, this omission being specially noticeable on page 159, where, in illustrating two forms of alveolar abscess and fistula, the original designs of Dr. Black are directly copied and without any acknowledgment whatever. This oversight we are sure will be corrected in subsequent editions.

Taken as a whole, the second edition of Prof. Dubois's admirable manual cannot fail to confirm the favorable impression made by the work in its earlier form, and to add to the luster of the author's reputation both as a teacher and writer.

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## OBITUARY.

## DR. SAMUEL D. FRENCH.

DIED, at Troy, N. Y., July 21, 1889, of paralysis of the heart, SAMUEL D. FRENCH, D.D.S., in the fifty-ninth year of his age.

Dr. French was born at South Chesterville, Maine, March 11, 1831. He graduated from the Baltimore College of Dentistry in 1854. The following year he removed to Troy, where he resided until his death. He was treasurer of the Third District Dental Society, and for twenty-one years had been a member of the board of censors of the State Dental Association, having been elected last spring for another term of four years.

Dr. French was a courteous, friendly, generous man, esteemed in his profession and in the community in which he lived for his honorable and symmetrical character.

## MR. HORATIO G. KERN.

DIED, in Philadelphia, Pa., May 9, 1889, of cancer of the rectum, HORATIO G. KERN, in the seventy-fifth year of his age.

Mr. Kern was born at Hilltown, Bucks County, Pa., February 28, 1815. He had been engaged for fifty-two years in the manufacture of surgical and dental instruments, and was widely known to the dental and medical professions of the United States. He received many important testimonials, including a medal at the Centennial Exposition in this city in 1876, and at the World's Expositions in London and Paris. He also received a medal from the surgeon-general of the United States during the civil war.

Mr. Kern was a member and active worker in the Presbyterian Church, and bore the reputation of unquestioned probity.

## DR. WALTER BROOKE ROBERTS.

DIED, in Titusville, Pa., July 30, 1889, of pneumonia, WALTER BROOKE ROBERTS, D.D.S., in the sixty-seventh year of his age.

Dr. Roberts was born May 15, 1823, in Moreau, Saratoga County, N. Y. In 1860 he became proprietor and editor of the *New York Dental Journal*; was a manufacturer of artificial teeth and proprietor of a dental depot; was one of the organizers of the New York College of Dentistry, and treasurer of the American Dental Convention. He had served as mayor of Titusville, member of the State Legislature, State senator, and was three times nominated for Congress on the Republican ticket, but failed of election. In connection with Colonel E. A. L. Roberts, deceased, he patented a torpedo used in blasting oil-wells, realizing from the invention a large fortune.

## DR. WM. G. ALLEN.

DIED, at East Lake (Birmingham), Ala., July 8, 1889, of paralysis, WILLIAM GAINES ALLEN, M.D., in the seventy-first year of his age.

Dr. Allen was born in Elbert County, Georgia, November 11, 1818. He commenced the practice of medicine in 1839, and of dentistry in 1842, and continued to practice both professions in Georgia until January, 1882, when he went into copartnership with his son, T. M. Allen, D.D.S., at Eufala, Ala., and continued in the exclusive practice of dentistry until failing health compelled him to retire. He moved to Birmingham in 1887. He was an active member of the Georgia State Dental Society, and of the Alabama Dental Association. He leaves a wife and four adult sons,—two of whom are dentists. His character was that of an honorable Christian gentleman.

C. A. M.

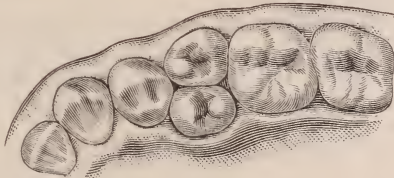
## DR. FISKE FAY.

DIED, at Brussels, Belgium, July 16, 1889, DR. FISKE FAY, in the seventy-sixth year of his age.

Dr. Fay was born at Boston, Mass., May 21, 1814, but spent a great portion of his life in Brussels, Belgium, in the practice of dentistry. He was at one time president of the Société Odontologique de Belgique, and was also the bearer of titles of distinction in several Orders.

## HINTS AND QUERIES.

DENTAL ANOMALY.—The grouping of three well-formed and fully-developed bicuspid in the manner shown by the illustration made it difficult to determine

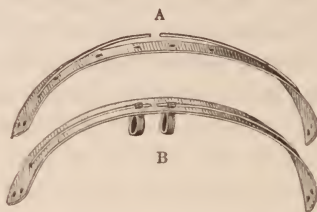


which was the supernumerary, and as nothing was to be done in the case an impression was taken for the purpose of putting on record what is believed to be a clearly unique anomaly.—W. S. RICHEY, D.D.S., San Francisco, Cal.

A NEW REGULATING DEVICE.—The appliance consists of a strip of gold plate, 26 gauge, three-sixteenths of an inch wide and about two and a half inches long. At intervals corresponding to the width of the upper oral teeth holes the size of a No. 3 bur are drilled through the strip, and at each end, opposite each other, two smaller holes are to be made. Two pieces of gold wire, say 20 gauge, are then soldered to the strip near its ends and so placed that the wires will overlay the holes and the free ends nearly meet in the middle of the strip, as at A in the illustration. It will be observed that each wire is soldered only at



one of its ends. Suitable rubber bands are then slipped over the wires, a piece of floss silk passed through each band, the ends of the silk put together and pushed through the holes in the plate, so that the rubber bands may be pulled through the holes and appear as shown at B. The number of bands will of course depend upon the number of teeth to be moved. The appliance as illustrated may be adapted to the drawing or pushing of irregular oral teeth into line, but it is preferable to form the strip upon a cast of the case so the holes may be drilled at



points corresponding to the anchorage teeth and to the positions into which the other teeth are to be brought. Ligatures through the end-holes will serve to secure the plate to the bicuspid or other anchorage teeth. The bands should be as thick as may be to act in separating as well as drawing the teeth. By suitably bending the plate it may be made to bear on the tooth or teeth which are to be moved inward, and thus the plate will both push and pull in effecting the regulation.

For holding the teeth until firmly set in their new positions, I employ a gold wire very carefully fitted and tied to each tooth with sterilized silk ligatures.

The appliance described is simple, effective, and occupies the least possible space between the teeth and the lips, which are not liable to be chafed by the plate because the bands or ligatures lie very close upon the plate over the wires, as is made obvious by the illustration.—J. H. MAGRUDER, Jackson, Miss.

**MOISTURE-TIGHT GUTTA-PERCHA FILLINGS.**—For this and the two subsequent "Hints" the writer is indebted to Dr. J. G. Templeton, of Pittsburgh, Pa., during a recent casual conversation :

Dissolve common resin in chloroform, and keep it at the consistency of varnish. After properly preparing the cavity, wrap a very little cotton on an excavator, dip in the solution, and neatly varnish the floor and walls of the cavity. Quickly pack the suitably-softened gutta-percha with a cold plugger, and trim the borders with thin hot instruments.

**ALUMINIUM PLATES.**—In swaging a dental plate of aluminium it is of the first importance to keep the plate from contact with either the zinc die or the lead counter, and for that purpose use the thinnest and best silk tissue-paper obtainable. Anneal the plate often by merely burning off a coat of oil. Place the tissue-paper on both sides of the plate, and keep a close watch on the paper in order to the immediate substitution of fresh paper for the sheet or sheets that may have become broken during the swaging.

**ALUMINIUM PLATES WITH VULCANITE MOUNTINGS.**—Light, durable, strong, cleanly, and sightly, these dentures are found to be very satisfactory to both the patient and the dentist. To this end it is necessary that the plate be kept from casual contamination while the process of construction is going on. When, therefore, by the means just described a perfectly clean plate has been struck up, a sharp-pointed graver is used to scratch and to spur in opposite directions the

ridge surface which is to be covered by the rubber; and if the roughing be rightly done, it is both needless and unsightly to perforate the plate, for the adhesion will be certain and secure.

After the teeth have been waxed upon the plate, and just before investing the piece, varnish the plate on both sides with sandarac varnish. When vulcanized, be careful not to disturb the varnish until the vulcanite has been properly polished. Then immerse or wash the denture in alcohol, which will remove the sandarac and also improve the appearance of the vulcanite.—W. S. H.

**IMPROVED LITCH BRIDGE-WORK.**—This is not an appliance applicable to every case, but has a wide range. The idea is not original, but suggested by a similar one presented to the profession by Dr. Litch in the *DENTAL COSMOS* for August, 1880, and March, 1886; also in the *American System of Dentistry*, and in Dr. Evans's book on crown- and bridge-work. I think Dr. Litch's idea applicable only to incisors and not strong enough to carry more than one tooth, while my improvement is sufficiently strong to carry all four incisors, or molars and bicuspsids, as I have demonstrated in practice.

The improvement consists in the shape of the caps, the disposition of the pins, and the method of making the attachments.

In preparing an incisor or cuspid, I first grind the cutting-edge enough to allow a sufficient amount of gold to be placed on its end to give necessary strength, beveling both the labial and the lingual side. I next cut a small hole on the lingual surface as high up as possible, or in the termination of the rudimentary cusp often

FIG. 1.

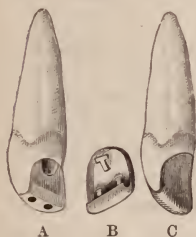


FIG. 2.

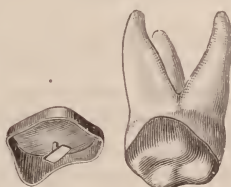
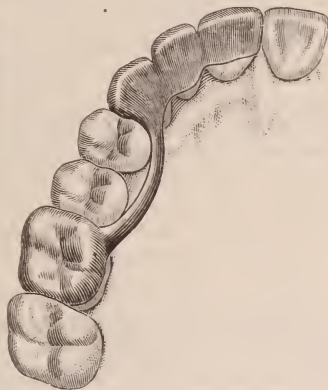


FIG. 3.



found in these teeth, and of sufficient width and depth to hold the flattened head of a platinum pin, such as is placed in teeth for vulcanite work; one or two similar holes are also cut in the cutting-edge (A, Fig. 1), that depending upon the number of dum-

mies I wish to support. The pins for these holes do not have their heads flattened. The hole on the lingual surface must be cut so that when the pin is placed in position it will occupy the same direction as to the long axis of the tooth as those in the end, so that it will subsequently draw readily. I next take platinum foil anywhere from 30 to 50 or 60 gauge,—it is not necessary to be exact. I bring this to a uniform white heat, which renders it so pliable that I can get a very fair impression of the tooth surface by finger pressure. The holes previously cut are represented in this impression, and I punch holes of exactly the same diameter as the shanks of the pins to be used. I now place the pins in position in the cavities prepared for them, waxing them if necessary to hold in place, put my finger-pressure-obtained cap over them, and burnish to a thorough fit, allowing it to come well over the labial surface. I now take an impression in

plaster of the lingual surface and end, warm the tooth with a hot-air syringe, which helps to harden the plaster and softens the wax so that the pins will come away with the impression. The shanks of the pins should be as long as possible, so that the plaster will grasp them firmly. I sometimes, where they fit closely, bend the protruding end so that it will be sure to draw with the cap. I now flow over the inside of the cap a solution of clay and glycerine, invest and solder with pure gold; also flow the same evenly all over the cap, remove from investment, place in position on the tooth, reburnish, remove, and flow on 22-carat gold to any desired contour for replacing portions of the tooth lost by decay or for filling cavities if they exist. By application of the above-mentioned solution no gold will penetrate the cap and so spoil its perfect adaptation (B, Fig. 1). When the proper contour and thickness have been obtained, I replace on the tooth and trim to proper shape, letting it extend well to the front on the side to which the dummy is to be soldered, but not on the other side (C, Fig. 1).

In making the like cap for bicuspsids or molars, I use the same process, but treat the teeth somewhat differently. I grind on the masticating surface only sufficient to allow the placing of a thickness of gold and platinum which will stand the wear of mastication; if no cavities exist which I can utilize for anchoring pins, I cut from two to four holes and put in headed pins as previously described. I also, if no cavity exists on the side to which I attach my dummy, grind a concavity extending nearly or quite to the gum line; that gives this portion more strength. A molar cap as it appears both off and on the crown of the tooth is shown in Fig. 2.

A bridge attached to two such caps and supporting an artificial lateral and cuspid is illustrated by Fig. 3.

I claim for this system: 1, The necessary strength; 2, A more natural appearance; 3, Less danger to the pulp by exposure of the fibrillæ of dentine in grinding, and the consequent irritation resulting often in the death of the pulp; 4, The ability to utilize a greater number of the best possible supports for a bridge, *live teeth*; 5, No irritation of the gum margin by the pressure of a foreign substance; 6, A better ability to keep clean and watch any disintegration of cement or decay, although, if the operation is skillfully performed, no line of cement will be visible, as the edges of the caps are so thin that they can be burnished to a perfect adaptation to the tooth.—W. E. GRISWOLD, Denver, Col.

THE COMMON "AUTOMATIC" EYE-GLASS HOLDER can be attached at any desired point on the chair, or on the clothing of the patient, to hold the rubber-dam out of the way after it has been adjusted on the teeth. A small hook fastened to the holder will facilitate the stretching of the rubber-dam in any desired direction.—M. G. J., Minneapolis.

TO THE EDITOR OF THE DENTAL COSMOS:

Sir,—Allow me to correct the statement by Dr. Bogue, as reported in the August COSMOS, on page 645, to the effect that it was Dr. Colton who administered the gas to Dr. Wells. The truth is that Dr. Riggs, under oath filed in the records of the Historical Society of Hartford, said in substance that Dr. Wells with his own hands administered the gas furnished by Dr. Colton, who at the time of the operation was standing in the door-way of the office. Furthermore, it was the *tooth* instead of "the teeth" that Dr. Riggs extracted. The preceding information was given to me by Dr. Riggs during my last conversation with him in the autumn previous to his demise, and is of consequence as related to the facts in the history of the discovery of anesthesia.—Yours respectfully, GEO. A. MILLS.



# A MONTHLY BIBLIOGRAPHY OF DENTAL LITERATURE.

COMPILED BY J. MELVIN LAMB, M.D., WASHINGTON, D. C.

THIS bibliography will be continued monthly in the DENTAL COSMOS, and will furnish as complete a record of dental literature as can be gleaned from current periodicals and transactions of societies.

The abbreviations of titles used are those common to bibliographical work, and will, it is presumed, be readily comprehended by any one familiar with dental or scientific publications. Any explanation will be gladly furnished by the compiler.

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## ORIGINAL COMMUNICATIONS.

### GROWTH OF ENAMEL.

BY FRANK ABBOTT, M.D., NEW YORK, N. Y.

(Read before the American Dental Association, Saratoga, N. Y., August 6, 1889.)

A GREAT many acute and conscientious observers have exhausted their talent in attempting to reveal the mysteries surrounding the development of the dental tissues. All these honest attempts we are most grateful for, as they serve as stepping-stones which enable us to reach a height that renders the history of the development of these organs fairly intelligible. Our modern researches have conclusively settled the fact that the laws governing the formation of dental tissues are the same as those governing all other tissues of the animal body. The stumbling-block has always been developing enamel. For many years histologists have agreed that enamel is originally an epithelial formation, and consequently to be considered as a dermal or tegumentary appendage, as Todd and Bowman, in their celebrated cyclopedia (1848-49), have termed it. Still, the result of metamorphosis of the epithelia was known to be the stellate reticulum, which closely resembles myxomatous connective tissue. All observers heretofore have shrunk from the idea that epithelium could ever give rise to connective tissue, on merely theoretical grounds. The idea that epithelium will, under all circumstances, produce epithelial derivations exclusively has apparently served as an insurmountable hindrance to the full understanding of the development of enamel.

How is it, we would ask, that brilliant thinkers could be satisfied with a single row of cells, supposedly epithelial in nature, that would give rise to a heavy layer of enamel, such as exists on the crowns of temporary teeth at the time of eruption? What is the function of the stellate reticulum,—a rather heavy layer of tissue, so notable for its beautiful structure? Is there any satisfaction in



the idea that this enamel-organ should serve merely for the nutrition of the enamel, or, as others have it, for protection, in the shape of a soft gelatinous cushion, against injuries of the enamel from without? It sounded almost like a revelation when G. Hertz, in 1866, had the courage to assert and maintain that the stellate reticulum contributes directly to the formation of the enamel through a new formation of cells. The mistaken conception that the sum total of what we term odontoblasts was to be considered as a membrane known as the "membrana eboris," and the sum total of what we call ameloblasts as a membrane termed "membrana adamantina," wrought havoc in the minds of many histologists.

The secretion theory was one of the outgrowths of this membrane theory. A few good men, I am sorry to say, still cling to it.

A. Kölliker, in his "Handbook of Histology of Man" (1852), speaks of development of enamel in the following terms: "The development of the dental substances has always been considered a very difficult topic. The relations are the simplest in the enamel, where not the slightest doubt prevails that the enamel-cells, by a complete calcification, become transformed into enamel-fibers (enamel-rods). As soon as a small portion of the cells, without any preliminary deposition of lime particles, is being ossified, we recognize a small lamella of enamel over the somewhat larger dentine cap, which has also recently originated. The deposition of lime proceeds in the cells from within outward till they have at last been transformed into enamel-fibers and simultaneously transgress on new cells, by which means the layer of enamel is broadened. While this is going on the enamel-membrane has not disappeared at the place where the ossification has started. On the contrary, we find this membrane always of the same breadth so long as the deposition of the enamel lasts, which proves that the ossified portion of the membrane is continuously being replaced by an additional mass. Apparently this is done, not by the production of new cells, but by a continual outgrowth of the original ones. The enamel-organ (stellate reticulum) is certainly of great importance in the building up of enamel, and owing to its richness in albumen and a gelatinous mass in its meshes is, so to speak, a pantry from which the enamel-membrane derives the material for its growth, being at some distance from the blood-vessels. In fact, we see this spongy tissue losing in its bulk during the development of enamel, and finally disappearing when the formation of enamel is completed."

I will here add that to Kölliker the enamel membrane means a layer of epithelia. He describes the enamel-organ as being made up of anastomosing star-shaped cells, or a reticular connective tissue, which in its meshes contains a large amount of albumen

and a liquid rich in mucus. The same author, in his work on the "History of Development of Man and Higher Animals," in 1879, claims that the stellate reticulum of the enamel-organ in appearance is identical with connective tissue, but is really nothing but a peculiarly transformed epithelium. Kölliker, therefore, in 1852, held an opinion that we consider to-day the correct one, which he very materially modified, almost to the point of abandonment altogether, years later. This author was the first to announce that the theory of exclusiveness is not tenable, in the process of development, from the three original embryonal layers, the "ectoderm," the "mesoderm," and the "entoderm," or, using Balfour's terminology, the "epiblast," the "mesoblast," and the "hypoblast;" and still he narrows his views to an almost incredible degree, in the chapter upon development of enamel.

John Tomes, in his "Dental Physiology and Surgery" (London, 1848; Philadelphia, 1853), gives wonderfully accurate drawings of what he calls enamel-pulp, or columnar tissue, now known as ameloblasts. On page 102 he explains the development of enamel-rods or fibers in the following words: "The cells being formed in lines, eventually become confluent; the points of union being sometimes transverse, and at other times oblique. At this stage the earthy elements are received, and the lines of union between the component cells of the fibers become less distinct, and are eventually lost, leaving a continuous fiber. The nuclei, from the first very small, are altogether lost in the formation of the fibers, or exist as very fine tubes passing through the length of each."

On page 104 we read: "To the best of my belief the transverse striæ are due to the alternate dilatation and contraction of the fibers,—each dilatation corresponding to the center of a formative cell, and each contraction to the junction of two cells."

From these quotations it becomes evident that John Tomes was a most careful observer. Even at that early date, with the limited powers of his microscope, he conceived the full truth when he stated "that each enamel-rod is the result of a juxtaposition of formative cells, between which are left the striæ." He considers the formative cells as the recipients of the calcareous matter in exactly the same way that we see it to-day.

F. Waldeyer, in his "Handbook of Histology," edited by Stricker, in Leipzig, 1869, page 347, describes the formation of enamel in the following manner: "The formation of enamel is done exclusively by the enamel epithelium, since the enamel-prisms are the result of a direct calcification of its long cylindrical cells. The boundary of petrification on the cells is by no means linear, but extends downward to an irregular depth,—a fact which likewise is not in favor of

the view that a secretion of the enamel-cells is being calcified. After treatment of young enamel with dilute acids, the enamel-prisms slightly swell and resume entirely the form of the previous cylindrical cells. The disappearance of the nuclei, in the process of the calcification of the cells, is of so common occurrence that their absence in the enamel cannot cause any wonder. Enamel, therefore, is to be considered as the petrified dental epithelium."

This author explains the formation of the stellate reticulum by a transformation of the epithelia, and considers its gelatin of a merely mechanical importance, since it keeps an open space for the growing tooth.

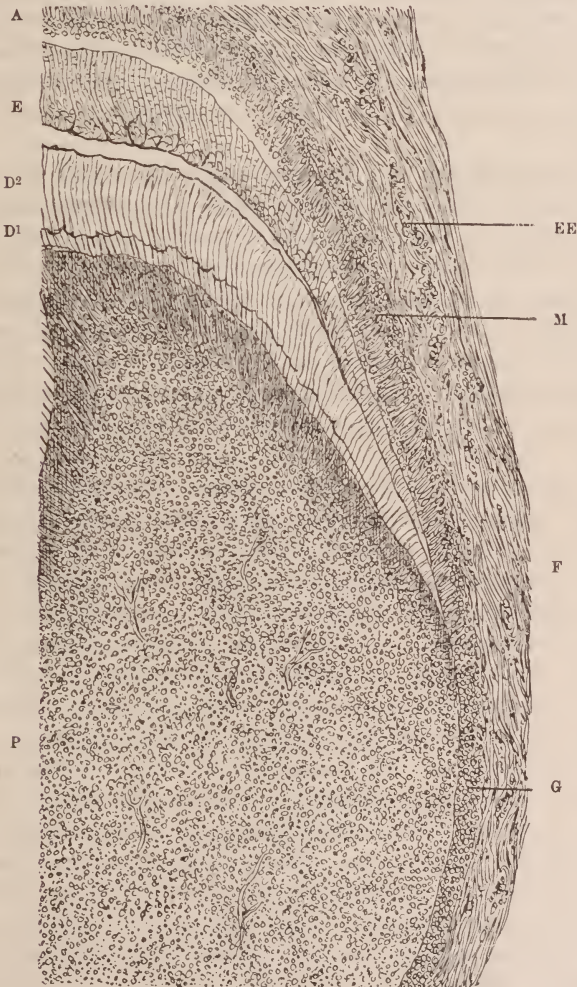
John and Charles S. Tomes, in their "System of Dental Surgery" (London, 1873, page 253) say, "The conclusions respecting the development of enamel which are most in accordance with appearances observed are these: The columns of the enamel-organ (enamel-cells, internal epithelium of the enamel-organ) are subservient to the development of the enamel-prisms into which they by calcification become actually converted. This conversion goes on in the following method: The proximal end of the cell undergoes some chemical change preparatory to calcification, and is subsequently calcified; but this calcification does not go on uniformly throughout its whole thickness, but proceeds from its periphery toward its interior, the central portion of the cell thus being calcified later than the external portion, which lies at the same level. At the same time that calcification is proceeding inward, in each individual cell, it has united the contiguous cells to each other. The calcification of the central portions of the enamel-fibers does not keep pace with that of their exteriors, nor even in fully completed enamel does it attain to precisely the same characters. In the progress of calcification the nuclei of the enamel-cells disappear, and it is probable, as is believed by Waldeyer, that the internal epithelium of the enamel is reunited by the cells of the stratum intermedium as it becomes itself used up by advancing calcification, converting it into enamel-fibers."

These authors give credit to Kölliker as the originator of the idea that the enamel-cells do not undergo direct conversion into enamel-fibers, but that the enamel is, as it were, shot out from their ends; that is, it is a secretion from them, not a deposition of lime-salts into their own substance. Our quotations from Kölliker's original German work, issued in Leipzig in 1852, plainly show that he at that time believed fully in the conversion theory. Since the Tomeses quote from the fifth German edition of Kölliker's histology, issued in 1867, it is obvious that he has changed his views, much, in my judgment, to his own disadvantage.



The latest publication upon the history of development of the enamel is that by C. Heitzmann and C. F. W. Bödecker,—“Contributions to the History of Development of the Teeth” (*Independent Practitioner*, vols. viii, ix, 1887-88).

FIG. 1.



*Tooth of human fetus, six months.*—P, papilla. D¹, non-calcified dentine. D², calcified dentine. E, enamel. A, row of ameloblasts. M, medullary corpuscles at the peripheral portion of ameloblasts. G, globular corpuscles from which ameloblasts develop. EE, buds of external epithelium. F, follicle, made up of fibrous connective tissue.  $\times 100$ .

This work is in harmony with my own observations, and furnishes the foundation of what I have to add, in the way of a more comprehensive idea, in the building process of enamel, than has heretofore

been advanced. This I propose to give in as few words as I conveniently can and make myself clearly understood.

Fig. 1 gives an illustration of these views. The figure, it must be emphasized, is not diagrammatic, but copied with the utmost care from one of Bodecker's specimens of a human foetus six months old, the period at which enamel begins to appear. The different layers, it will be observed, appear separated from one another. This is usually the case in even the most carefully prepared specimens, owing to slight mechanical injury in cutting, and shrinkage of the soft parts; the relations, however, are absolutely correct in this drawing.

After the epithelial peg has grown into the depth of connective tissue of the oral mucosa, in the twelfth week of embryonal development, the distal end of this peg becomes club-shaped, and then appears the first trace of medullary tissue, which two weeks later plainly shows the stellate reticulum. The club at this period assumes a cup shape, whose concave surface is lined by the internal epithelium, while the outer surface is made up of the so-called external epithelium, which is in uninterrupted continuity with the internal epithelium at the most prominent border of the cup. If we examine the lower edge of the cup of the enamel-organ at about the sixteenth week of embryonal life, we observe a peculiar change in the columnar bodies of the internal epithelium, which consists in the appearance of highly glistening globular bodies, in a more or less row-like arrangement, replacing the previous columnar epithelia. These bodies are either solid or slightly vacuolated, and are formations of living matter such as we are accustomed to look upon as medullary, embryonal, or indifferent corpuscles in their earliest stage of appearance. Obviously these glistening globules have originated from the reticulum of living matter of the columnar epithelia themselves. We feel justified in this conclusion from the fact that we can trace, step by step, the growth of these glistening granules up to the formation of glistening lumps, such as we have termed medullary corpuscles. The more the cup of the enamel-organ is enlarged, the more conspicuous becomes the transmutation of the previous internal epithelium into glistening lumps; so much so that toward the end of the fifth month of foetal life the original columnar epithelium at the concave portion of the cup has entirely disappeared. In its stead other bodies begin to show, first at the deeper portion of the cup, closely resembling columnar epithelia, now known as ameloblasts, or enamel-formers.

From this description it seems evident that all previous observers—with due respect to their judgment—have been in error in the assumption that the columnar epithelia of the internal wall of the

cup were identical with the ameloblasts. All of them have overlooked the intermediate stage of the glistening medullary lumps. In Fig. 1 these lumps are marked G. They are traceable down to the neck of the papilla, therefore to the point of recurvation of the previous internal into the previous external epithelium. The lumps, I wish to repeat, are extremely glossy, with a high degree of refraction. They are arranged, at first irregularly, in a layer of considerable breadth, higher up in rows, and by their coalescence and prolongation give rise to small columns, the ameloblasts. These are seen up to the end of the fifth month of foetal development at the deepest concavity of the cup and its lateral walls down to varying depths, and closely attached to the now forming dentinal cap. The odontoblasts grow smaller toward the thin extremity of the dentinal cap, and below its end they appear as blunt and short columns, while, close above, the ameloblasts make their appearance, being traceable all around the outer periphery of the dentinal cap.

In the sixth month of foetal life, as is well known, the enamel-cap begins to show; first at the summit of the dentinal cap, where it gains its greatest breadth, gradually becoming thinner toward the sloping sides, and, as a whole, a trifle thinner and shorter than the dentinal cap.

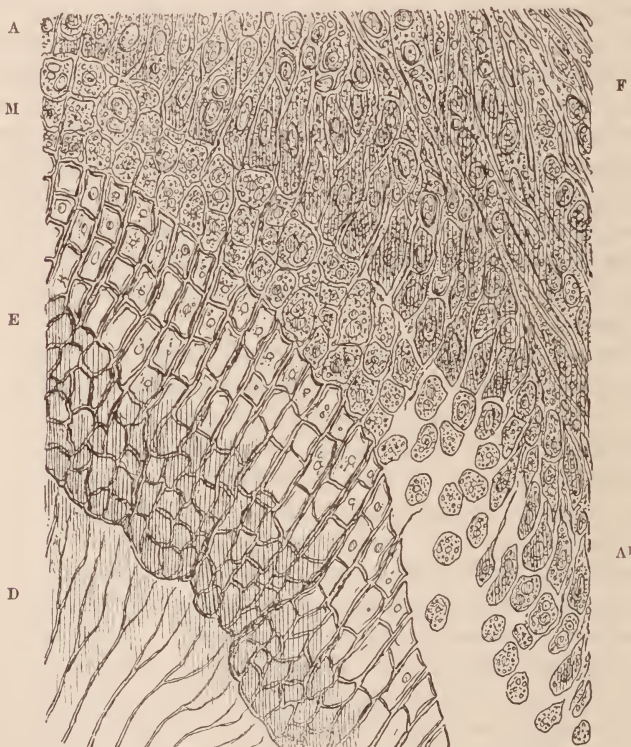
If we now examine the ameloblasts close above the already-formed enamel, we will observe finely granular bodies, arranged in a row, between the enamel and ameloblasts. These are best seen in specimens where the hardening and cutting procedures have not caused a detachment of the soft tissues from the hard,—i.e., the enamel-organ from the calcified enamel. It is seldom that this is accomplished; but a few of such perfect specimens are in Bödecker's collection, which by his kind permission I have used for my studies and these drawings. Even though a slight detachment has occurred, the enamel-organ still remains intact, and the finely granular corpuscles at the proximal ends of the ameloblasts remain visible.

What are these finely granular bodies? The last-named authors claim that they are medullary corpuscles, holding small and indistinct or no nuclei, and only a very small amount of living matter, which accounts for their finely granular appearance with low powers of the microscope. They further claim that these corpuscles, or the liquids contained in their reticulum, become solidified into basis-substance, and immediately infiltrated with lime-salts. They claim also that the enamel-rods are built up by rows of such calcified or "petrified" medullary corpuscles, the successive arrangement of which into rows causes the more or less regular appearance of the transverse striæ of Retzius, whereas between the rows longitudinal interstices will remain, filled, perhaps, with a small amount of cement-



substance, differing in its chemical constitution from the basis-substance of the rods proper, and in its interior holding extremely delicate fibrillæ (Bödecker's enamel-fibers) which branch into the transverse striæ. Being satisfied that the views of these gentlemen are correct, I will simply add a new feature, to make those views more symmetrical,—and, as it occurs to me, it is a feature of considerable importance: viz., the changes that take place in the ameloblasts during the process of the formation of enamel (Fig. 2).

FIG. 2.



*First-formed enamel of human foetus, six months.*—D, dentine. E, enamel toward the dentine, made up of irregular calcified fields, toward the periphery of prisms with transverse interruptions. M, medullary corpuscles finely granular, from which the enamel-prisms are formed. A, ameloblasts, toward the enamel breaking up into medullary corpuscles, toward the periphery rebuilt by such corpuscles. A¹, irregular ameloblasts torn from their connection with enamel. F, Fibrous connective tissue, changing to medullary tissue.  $\times 800$ .

The ameloblasts, as just stated, split up into rows of finely granular medullary corpuscles, and consequently are reduced considerably in their size. In fact, it is difficult to find full-sized ameloblasts at the summit of the enamel-cap, where the production of enamel is most active, the same as it is impossible to find full-sized odonto-

blasts at the summit of the papilla, where the formation of dentine is most active. The mutilated ameloblasts in this situation still exhibit nuclei, although their forms are odd,—mostly cut or broken, with offshoots running upward and laterally toward the stratum intermedium. At the same time peculiar glistening, homogeneous lumps and irregular wedge-shaped nucleated bodies appear between the offshoots of the ameloblasts; not as regular, however, as the original medullary corpuscles were, from which the ameloblasts originally developed. All these indifferent bodies must have arisen from the living material stored up in the stratum intermedium, close above the row of ameloblasts. By their occasional row-like arrangement I am led to the conclusion that they serve for a *restitution* or *rebuilding* of the ameloblasts (which at their proximal ends have split up into *enamel-formers*), and thus serve to establish a continuity of the ameloblasts, and, in turn, of the enamel-rods, throughout the whole thickness of the enamel. In a previous article I have endeavored to show that odontoblasts, being split up at their distal ends into medullary corpuscles, enter directly into the formation of the basis-substance of dentine, at the same time being superadded to at their proximal ends by medullary corpuscles derived from the living matter of the papilla. Thus the continuity of the odontoblasts and dentine is established, stratification of the dentine being the exception. I now assert a similar procedure for the ameloblasts, in a reverse direction, owing to the centrifugal direction of enamel growth. *The ameloblasts being broken up at their proximal ends into medullary corpuscles, which are directly transformed into blocks of enamel-rods, are superadded to at their distal or peripheral ends by medullary corpuscles derived from the stratum intermedium.* Normal enamel is non-stratified; its rods or prisms run a wavy course, as a rule uninterruptedly, from near the dentine to the cuticular (Nasmyth's) membrane.

Several years ago I described stratified enamel as rather an anomalous occurrence, it being as a rule connected with pigmentation of its rods. The study of this condition enabled me to show the manner in which enamel is formed,—first in crown layers around and upon the cusps, and much later in lateral or neck layers at the sides of the crowns. This fact again proves that the most active formation of enamel always takes place at the summit of the crowns or upon the cusps; while the lateral layers are formations of a much later date, and are much thinner.

Neither the structure nor the development of this tissue is to me explicable on the ground of the cell theory, which suggests that each cell is an individual, and but exceptionally in connection with its neighbor. With us a cell is a lump of protoplasm, in which

the living matter is stored up in different shapes. The glistening globules of small size, having arisen from the protoplasm of the original columnar epithelia of the enamel-organ, represent a juvenile condition of living matter in its most compact aggregation.

The medullary corpuscles, sprung from the ameloblasts, show only a delicate reticulum of living matter, being ready for immediate transformation into basis-substance and calcification. Between these extreme stages stand the ameloblasts, with their vesicular nuclei, and a markedly heavy reticulum of living matter in their interior. The indifferent corpuscles, serving to supply additions to the ameloblasts, exhibit all intermediate stages between small, globular, glossy and compact globules up to distinctly nucleated protoplasmic lumps. Whatever the size and shape of such lumps

FIG. 3.



*Ameloblasts beginning the formation of enamel; from human fetus, six months.*—D, border of newly-formed dentine. E, first trace of forming enamel. A, row of ameloblasts. M<sup>1</sup>, medullary corpuscles for restitution of ameloblasts. M<sup>2</sup> medullary corpuscles just previous to their infiltration with lime-salts. F, fibrous connective tissue, the so-called intermediate layer.  $\times 1000$ .

may be, they are invariably connected with one another by means of delicate offshoots, which vary greatly in thickness and in their course. Each ameloblast sends offshoots toward the dentine in great numbers, known as Tomes processes. They also run upward toward the intermediate layer, and laterally for the immediate union of neighboring ameloblasts. (See Fig. 3.)

Broad and clumsy offshoots, such as depicted by Tomes and Waldeyer, are visible only upon torn and teased ameloblasts. So long as these bodies are *in situ* the offshoots are always delicate, and visible with higher powers of the microscope only,—i.e., from 800 to 1000 diameters. By the splitting up of the ameloblasts in a longitudinal



direction, delicate wedge-shaped pieces arise between funnel-shaped or square bodies. By the coalescence of the lateral offshoots in a longitudinal direction, delicate fibrillæ originate between the ameloblasts, known as Bödecker's enamel-fibers.

When the formation of a tissue is going on, we conclude, from the great variety of forms of the protoplasmic bodies, that there is not for a moment rest either in the growth or in the new formation of living matter. Thus the proximal ends of the ameloblasts, through the intermediate stage of medullary corpuscles, are metamorphosed into the calcified basis-substance of the enamel-rods. The distal ends exhibit the stages through which the living matter passed before the original ameloblasts were formed. Still the question remains an open one, whether or not ameloblasts are an absolute requirement for the production of enamel after the formation of the rods has once begun. The rows of globular bodies as seen in Fig. 3, M<sup>1</sup>, strongly favor a negative answer to this query. Nothing but a transmutation of solid globular lumps of living matter into delicately reticulated medullary corpuscles seems to be required for the building up of the minute blocks of enamel-rods without the intermediate stage of ameloblasts. We must admit, however, that, for symmetry of construction, the part played by these bodies seems essential. Although greatly varying in size, even in the same tooth, we consider ameloblasts as merely provisional formations, by no means stable or unchangeable. This conclusion is the same as that we reached in regard to the significance of odontoblasts.

Full development of ameloblasts into oblong or conical bodies, each of which containing one or two nuclei, sharply bordered by a delicate cuticular formation toward the papilla, and distinctly marked by the intermediate layer toward the enamel-organ, are invariably seen only in the condition of temporary rest, where the formation of enamel has not as yet started. (See Fig. 4.) As soon as the first trace of enamel is seen the ameloblasts lose their regularity by being split up toward the dentine, and are superadded to from the intermediate layer.

The first-appearing enamel is made up of irregular angular and glistening lumps, greatly varying in size. (See Figs. 2 and 3.) The first blocks of enamel-rods show compact edges and comparatively thin and translucent centers, in which even traces of the nuclei of the medullary corpuscles are to be seen. This plainly shows the correctness of the assertion of Tomes, that "the enamel-rods are calcified from the periphery toward the center." The irregularity of the first-formed calcified blocks also accounts for the fact that fissures and breaks are of such common occurrence in specimens of enamel, either ground or cut, at the border toward the dentine, as I

have previously demonstrated in an article on the anomalies of enamel, such anomalies being most common in this situation.

We now return to the enamel-organ, of which it is known that it begins to show at the end of the third month of intra-uterine life, by the appearance of medullary corpuscles between the internal and external epithelium. From the fourth month to the seventh or eighth, the beautiful stellate reticulum known as the enamel-organ comes to view. Although Huxley and Kölliker have stated (in 1850-52) that this is connective tissue, all modern writers, including Kölliker himself, insist that it is a peculiarly modified epithelium. I contend that this reticulum is true myxomatous, and the stratum intermedium true fibrous connective tissue. The first microscopist to describe and illustrate the intermediate layer was John Tomes,

FIG. 4.



*Ameloblasts at rest; from developing tooth of human foetus, six months.*—A, row of ameloblasts. I, I, intermediate layer. M, myxomatous reticulum. P, papilla. S, so-called structureless membrane.  $\times 1000$ .

in 1848, in his work above quoted. This credit is usually given to Hannover, whose work appeared in 1856.

As to the significance of the enamel-organ, I must take decided exception to the views of most modern writers, viz., that it serves as a kind of protecting cushion, or to preserve an open space for the tooth to grow into. In my opinion the view first announced by Hertz in 1866, that "the enamel-organ is stored-up material for the benefit of the growing enamel itself," is the correct one, the same as is the intermediate layer. The reasons for this are given by Heitzmann and Bödecker in their above-quoted article.

One fact will strike every observer, viz., that the enamel is seldom,

if ever, perfectly symmetrical in the growing tooth, one side being broader, to the extent of five or six times, than the other; sometimes it is found only on one side of the developing tooth, while on the other nothing but delicate fibrous connective tissue is seen. From these facts we must conclude that the myxomatous form of this organ is by no means a characteristic or an absolute requirement.

How can we explain the scantiness of this organ at the summit of the crown, where in full development the enamel has the greatest

FIG. 5.



*Developing tooth of sheep's foetus, 10 centimeters long*—D, dentine in longitudinal and transverse sections. A, row of ameloblasts at rest. A<sup>1</sup>, ameloblasts broken up into medullary tissue, preceding the formation of enamel. I, I, intermediate layer. M, M, myxomatous enamel-organ. C, capillary blood-vessels.  $\times 1000$ .

diameter? Can the original enamel-organ, even ever so broad, suffice for the production of the whole enamel? Is not the enamel coat of a temporary tooth five, nay, ten times as broad, as the original enamel-organ? All this strongly points toward the fact that the budding external epithelium, and even the primary epithelial peg, must furnish material for the building of enamel, no matter what the intermediate or subsequent changes of this tissue may be.

In conclusion, I wish to say that I have studied the development of enamel in pigs and sheep, and have found the relations similar to those in human beings. (See Fig. 5.) In the sheep's foetus, ten centi-



meters long, the form-changes of the ameloblasts are especially pronounced, since shortly before the appearance of the enamel a splitting into medullary corpuscles takes place, for the production of enamel-rods, at the same time new medullary corpuscles show themselves at their distal ends, evidently produced at the expense of the intermediate layer. Both the last-named layer and the blood-vessels in the myxomatous enamel-organ have been observed and depicted by John Tomes as early as 1848,—an admirable instance of acute observation of lasting value.

### CLASSIFICATION OF TYPICAL IRREGULARITIES OF THE MAXILLÆ AND TEETH.

BY EUGENE S. TALBOT, M.D., D.D.S., CHICAGO, ILL.

(Read before the American Dental Association, Saratoga, N. Y., August 7, 1889.)

THE literature of the etiology of irregularities of the maxillæ and the teeth is meagre, showing that its study has been limited. Scientific investigation in this department has been neglected for reasons that are obvious. In the first place, to come to correct generalizations it is necessary to make extensive observations. Generalizations based on the observation of a few facts are of little value. Few practitioners enjoy opportunities for studying many cases, as the correction of irregularities forms the exception in general practice. To arrive at correct conclusions as to the causes of deviations from the normal it is necessary to take impressions and preserve casts for study, to visit asylums and schools of defective individuals such as the insane, deaf and dumb, blind, and idiots, and to compare such observations with those made of normal mouths. Before the student can crystallize his observations into theories, his studies should extend over a number of years, include a large number of cases, and a comparison of his conclusions with those of others, carefully weighing their objections and arguments.

It will thus be seen that the average practitioner has neither time nor opportunities for such researches, and that only a genuine love for the subject will urge to the toil and patience necessary to accomplish much in this field. A number of cases that came under my observation over ten years ago led me to read all the literature then extant, which was found to be limited chiefly to the correction of irregularities, the causes not having been touched upon to any extent. The asylum for feeble-minded children at Media, Pa., offered an excellent field for study. Irregularities were numerous here. It was natural to ask, Why should irregularities of the jaws and teeth accompany idiocy? A neurotic condition and arrested brain-centers are invariably found in these cases. These produce

excessive development or arrest of development of the skeleton and soft tissues of the body. Why should not the maxillæ and teeth be affected in the same way and asymmetry be produced? The teeth were not found of abnormal size and proportions, but the relative development of maxillæ and teeth was found to be unequal. Observations extending over a number of years in the different asylums of Illinois among the insane, deaf and dumb, and idiotic strengthened this view. Impressions taken during the past eight years, amounting to over eight hundred, together with the large collections of Dr. Farrar, of New York, and Dr. Shepard, of Boston, over two thousand in all, furnished abundant matter for study and comparison. Observation was also made of irregularities of the teeth in individual cases, in a number of which impressions of the mouth were taken every three months and the models compared to note the changes. It was found that in some complex forms of irregularities the teeth subsequently arranged themselves into the simpler forms mentioned hereafter.

As the study of irregularities is a comparatively recent one, the attempts at classification have been necessarily elementary, and the causes that produced variations from the normal have been scarcely touched upon. Particular pains have been taken in these investigations to study into the causes that produced them. It is intended to show in this paper, but more fully in a work now in preparation, that every case of irregularity is traceable to one or more causes, in conformity with the laws that govern the physiological and pathological processes of the rest of the body. There is a constant relation between dentistry and other departments of medicine which needs to be emphasized in this connection,—not relative to mechanical substitutes and appliances, but including physiological, pathological, and therapeutical problems. The laws governing the health and disease of the mouth do not differ from those appertaining to the rest of the body. The correctness or incorrectness of a theory advanced with regard to abnormal conditions may be determined by the application of this test.

All irregularities of the maxillæ and teeth may be traced to the following causes:

I. *Constitutional*: mal-proportion and mal-relation of the maxillæ due to excessive or arrested development.

II. *Local or circumstantial*:

- (1) Improper occlusion;
- (2) Want of accord between waste and repair;
- (3) Neglect of function.

These causes are deviations from the general laws that govern the healthy relation and function of the teeth:

- I. A proper relative size of the organs of mastication ;
- II. A proper occlusion of the teeth ;
- III. Accord between the processes of waste and repair ;
- IV. Proper functional activity.

These form the basis of the classification adopted.

In correcting irregularities it is necessary to determine the cause in each case; only in this way can they be successfully dealt with. In this paper an attempt is made to classify irregularities according to their underlying cause, and to explain as concisely as possible the similarities and differences upon which the classification is based.

Such a system of classification not only helps us to get a clearer view of each variety, its cause and best method of correction, but the study of deviations from the normal helps us to a more correct view of the normal jaw. The monstrosities of nature often give a clue to her laws. The study of irregularities has therefore a bearing not only on dentistry, but on anatomy, physiology, related pathological conditions, and also on some questions of sociology.

In order that aberrations from the normal may be better understood, let us first consider the question, what constitutes a normal arch.

There are three characteristics of the normal arch. Independent of temperamental peculiarities, the line extending from one cusp to the other should be an arc of a circle, not an angle or straight line; the lines from the cuspids to the third molar should be straight, curving neither in nor out, the sides not approximating parallel lines. Absolute bilateral uniformity is not implied in this, as the two sides of the human jaw are rarely if ever wholly alike. A uniform arch necessitates a uniformity of development between the arch of the maxilla and the arch of the teeth, and a correct position of the individual teeth in their relation to each other. When there is inharmony of development between the jaw and the teeth, as may happen when one parent has a small maxilla with correspondingly small teeth, and the other a large one with correspondingly large teeth, if the child inherits the jaw of one and the teeth of the other, irregularities must follow. Such difference in diameter between the arch of the maxilla and that of the crowns of the teeth is a constitutional cause of irregularity.

Whenever there is a difference between these diameters, the line formed by the teeth must either fall outside or within the arch of the maxilla, and irregularities of arrangement result. A local cause is established by a forward movement of the first molar due to premature or tardy extraction of deciduous teeth, or the arrested growth of the ramus or of the lower maxilla. It will be seen by examining each type of irregularity that constitutional causes are



not alone responsible, local causes almost invariably co-operating. Hence it appears that there is no propriety in speaking of inherited irregularities of the teeth *per se*. Constitutional and local causes combine to produce the result,—i.e., a maxilla smaller than the diameter of the teeth. A high arch is not the result of irregularity, as has been supposed. This inference might be drawn from the fact that in both of the primary forms of irregularity, the V-shaped and saddle-shaped, the lateral diameter of the arch is contracted. But the high vault is a peculiarity of the nervous temperament, and is found independent of irregularities. If irregularities and high vaults were always concomitants, this inference would appear tenable; but it is more reasonable to suppose that overlapping of incisors to some extent results from a contracted vault than that the contracted vault results from the overlapping. The character of the dome is determined before that of the teeth, for when the permanent

FIG. 1.

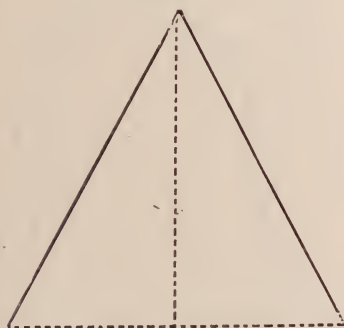
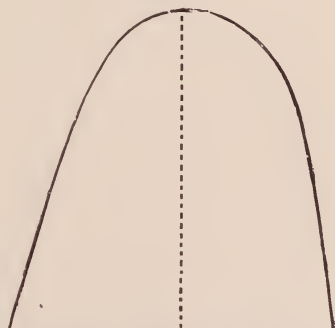


FIG. 2.



teeth make their appearance the dome is pretty well developed. It is therefore reasonable to conclude that a high and comparatively narrow roof are the peculiarities of a type, just as high cheek-bones and a massive jaw are.

The primary divisions of irregularities are the V-shaped and saddle-shaped arches. We have the V-shaped variety (Fig. 1),\* where the apex of a triangle is formed by two incisors, the base of the triangle being a line connecting the two first molars. If because of premature or tardy extraction the first molar moves forward, or the coincidence of the arch of the maxilla and the arch of the crowns of the teeth is disturbed, the arch formed by the crowns of the teeth in trying to accommodate itself to the lesser arch of the maxilla becomes a broken line forming an angle at the incisors.

\* While the general outlines of the jaws and teeth are the same, in no two cases are they exactly alike. The cuts therefore are not drawn from actual cases, but are ideal diagrams of typical cases.

This angle results from two causes,—the thinness of the process at this point and the diminution of resistance which must follow.

Modification of the V-shaped arch results from modifications of the above-named conditions. A difference in the time of eruption of the cuspids, everything else being equal, effects a difference in the space left for their accommodation, and thus partial V-shaped arches are found. The key-stone, the cuspid, is not entirely outside or inside of the arch in the partial V-shaped form, but may appear partially crowded out of place. Hence the arch is neither a normal curve nor wholly angular, but unites the characteristics of both. Its lateral diameter is less than that of the normal arch, giving it a contracted appearance. (See Fig. 2.) Thus a number of varieties of the fundamental forms of the V-shaped arch are formed, differing in degrees of anterior contraction. All of these result from the comparative thinness of the anterior portion of the process offering

FIG. 3.

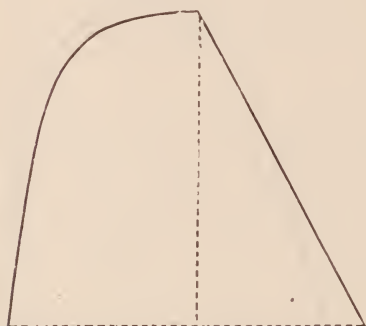


FIG. 4.



but little resistance, an abnormal pressure from behind, and the greater strength of the cuspids, which causes them to seek room irrespective of the space left for them. When one side of the process near the symphysis is the stronger, thus affording greater resistance, or the pressure from the cuspid is less, that side may maintain its normal relations while the other may give way to conditions resulting in a V-shaped contraction. The curve will then be broken, not at the apex of the triangle, but near it; the incisors will overlap, and when pressure from the cuspid acts on the weaker column it must give way. This results in the semi-V-shaped form. (Fig. 3.)

When the permanent bicuspid erupt under favorable conditions, so that their greatest diameter is in a line with the greatest diameter of both cuspid and first molar, they will be held firmly in place, since the greatest pressure is on this very line. On the other hand, when the bicuspid are erupted *after* their proper time while the cuspids progress duly, the cuspids meeting with no resistance fall into

their proper places, but the bicuspid adapt themselves as best they can to the space left for them, and if the arch of the maxilla does not coincide with that of the crowns, they must fall within or without the arch. Now if the first molar has moved forward, diminishing the space, the bicuspid must erupt either within or without the arch.

To understand why they are generally found within the arch, the shapes of the molar and cuspid must be kept in mind. A transverse section of their crowns shows their proximal walls not to be parallel but wedge-shaped, their diameter being greater on the buccal than on the palatal side. When the crowded bicuspid fall within the greatest diameter of these teeth, finding more room within the arch, they naturally slip in the direction of least resistance,—*i.e.*, toward the palate. A local cause for the same condition is found in

FIG. 5.

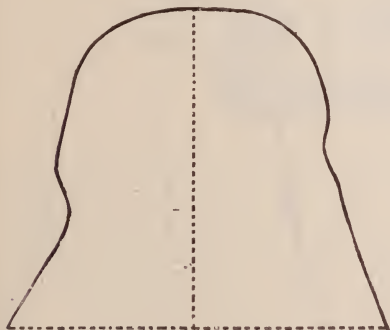
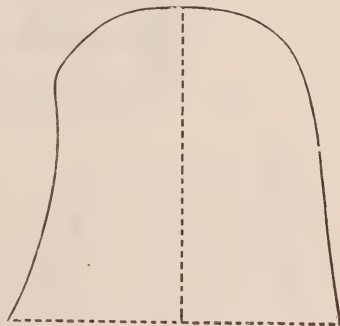


FIG. 6.



the fact that the crowns of the bicuspid before their eruption are imbedded in the roots of the temporary molars, and as these form an arc of a smaller circle than that of the permanent teeth, the bicuspid will be found generally inside the arch. From both causes we have an inward curvature, which we term the saddle-shaped arch. (Fig. 4.) It should be noted here that while the V-shaped irregularity is found anterior to the cuspid, the upper incisors always projecting beyond the lower, the saddle-shaped irregularity is invariably posterior to the cuspid, and the bicuspid form an inward curve. The incisors never project. Both forms contract the arch, the V-shaped anteriorly, the saddle-shaped posteriorly. In both forms the forward movement of the first molar is the local cause. When the unfavorable conditions that result in the saddle-shaped arch are not so pronounced, we have the partial saddle-shaped arch. Thus because of the greater uniformity of the maxilla and of the arch of the crowns there may be more space, and the bicuspid may be forced but little out of place, or the molar may move forward but slightly, interfering less with the bicuspid.



Sometimes it happens that in trying to adjust themselves to the limited space one bicuspid may be crowded outward and another inward. Sometimes the first bicuspid is in, more frequently the second. (Fig. 5.) As has been stated before, this could not take place if the greatest diameter of cuspid, bicuspid, and molar were in the same line, but the diameter of one of the bicuspids may be in a line with that of the adjoining tooth while that of the other is not, and then one is pressed along the line of the least resistance. As in the case of the V-shaped arch, one side of the mouth may be normal because of the absence of any local condition interfering with the space. One temporary molar may have been extracted, allowing the permanent one to move forward while the other remains in place. The result which follows is an asymmetry of lateral halves termed semi-saddle-shaped irregularity. (See Fig. 6.)

FIG. 7.

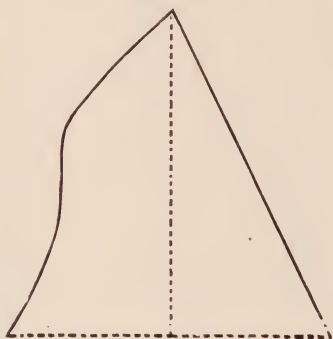
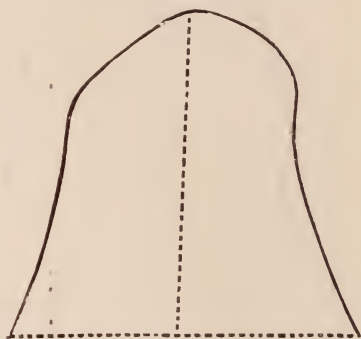


FIG. 8.



How the V-shaped and saddle-shaped arch on one side only may be produced has already been described. How they may be combined on one side remains to be explained. Given thinness of process in the anterior part of the mouth, premature or tardy extraction of the cuspid, and there will be a forward movement of the incisors. The development of the cuspid will press the alveolar process inward, thereby contracting the arch, and the tardily erupted bicuspids will adjust themselves to the limited curve as before stated. In this way the features of the two forms are combined; that is, a contracted or angular anterior arch, and a posterior arch that is more or less concave. The opposite side may be V-shaped, saddle-shaped, or normal. (Figs. 7 and 8.)

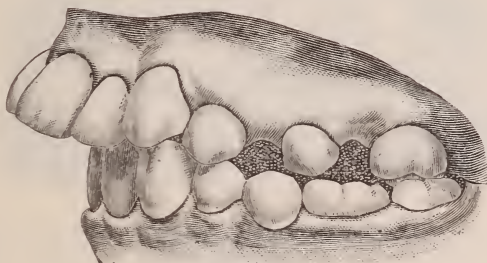
The large collection of models illustrating these different forms of irregularities of the jaws and teeth which was on exhibition at the meeting of the American Dental Association, has been placed in the Army Medical Museum at Washington, and may be examined at any time by those interested in this work.

## A CASE OF IRREGULARITY AND ITS TREATMENT.

BY HENRY N. DODGE, M.D., D.D.S., MORRISTOWN, N. J.

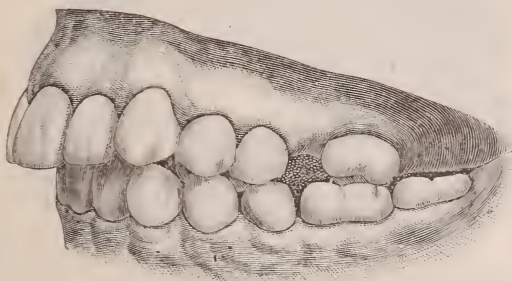
THE case of irregularity illustrated by the accompanying figures appears to possess sufficient interest to warrant a detailed description. In Figs. 1, 3, 5, and 7 is shown the exact condition in which the case was presented to me, while Figs. 2, 4, 6, and 8 show the position of the teeth when it left my hands. The patient was a girl of thirteen, apparently in perfect health, of nervous temperament,

FIG. 1.



well-marked character, and indomitable will. According to the statement of the parent, the first upper molars, which were imperfect, had been extracted six months before the case was brought to me, and at that time the second upper bicuspid had been forced back by a series of wedges. After this, a retaining-plate was worn to hold the teeth in *statu quo* during the summer. In the following autumn it became necessary for the family to remove to Morristown,

FIG. 2.



and the case was submitted to me for treatment. If the first molars, though poor, had been filled and left in place, and the first bicuspid extracted instead, the case would have been a comparatively simple one; but with nothing now left but the two half-grown second molars and the recently-moved second bicuspid to pull against, the difficulties were increased and the patient subjected to an

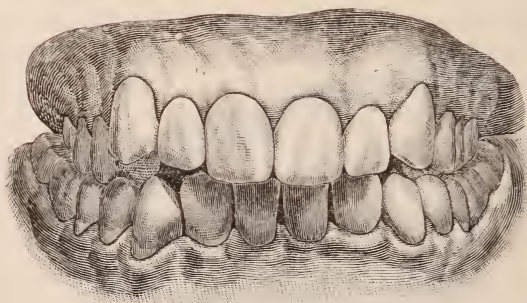
ordeal that would have severely tried a less robust constitution. It might be suggested that the six oral teeth and the first bicuspid ought to have been drawn back by means of the occipital bandage, using the occiput instead of the molars as a point of resistance. That appliance, however useful at times, and used by myself as early as 1879 for the retraction of the inferior maxilla in a case of excessive dental irregularity, is at best a hideous disfigurement which

FIG. 3.



would hardly have been tolerated excepting as a last resort. The most obvious resource, then, was to fasten suitable appliances to the second molars and second bicuspid, and to draw back the eight anterior teeth, one pair at a time, securing each pair in its new place when sufficiently moved, and then make traction upon the next pair in order. When the bicuspid and cuspid had been thus drawn back and still more room was needed for the backward movement of the incisors, the arch was next expanded, moving the four

FIG. 4.



bicuspid laterally with a split rubber plate spread by a powerful screw. Having thus made space for the four incisors, they were drawn back into the dental arch by a yoke, grasping the centrals, and governed by a screw. Then all four incisors were rotated by means of a bow of heavy flat gold wire passing in front of the incisors and capable of a backward movement governed by nuts and screws. To the middle of the concave side of this bow was



soldered a short, thin blade or spur which passed between the centrals. This blade is very useful in maintaining true relations to the median line, where there is a tendency to lateral movement of the incisors while being drawn back. While this bow held the incisors in the desired arch, a gutta-percha-tipped gold screw set behind the disto-lingual angle of each incisor and turning in the rubber plate to which the bow was attached, rotated the four teeth, each on its axis. This fixture, when accurately made and applied, is very powerful. Now, it is evident that no pair of half-grown molars and no recently-moved second bicuspid could stand such a "tug of war" as these underwent and yield nothing to the strain. How much they did yield may be seen by examining Fig. 2, where it is shown that the superior second molar has been drawn forward its own width, and with it these second bicuspid has also been moved. But while moving forward themselves, they also dragged back into place eight teeth as firmly fixed as any that ever grew, and what was a marked defor-

FIG. 5.



mity was transformed by the operation into a pleasing set of teeth, satisfactory to the patient and her friends and more than realizing their expectations.

The gutta-percha-tipped screw mentioned and also a screw with a tip of elastic rubber are two of my inventions, which I will here describe. The rubber-tipped screw was used first, and is made by cutting from a tube of suitable diameter, made of rather hard gold alloy, a piece of any desired length. On the external surface of the tube a screw-thread has been cut and the inside left smooth. Across one end of the tube is cut a slot for a screw-driver, or one end of the tube may be filed square to fit a watch-

key or wrench. A small ring of elastic rubber is now strung upon a piece of thread, and the free ends of the thread pushed through the smooth bore of the tube to pass out at its slotted end. Another thread is next passed through the rubber ring, as before, and both ends are held by an assistant, or tied to a fixed object. Holding the screw-tube with the left hand, the rubber is stretched by drawing with the right hand upon the string which passes through the tube, and as the rubber becomes small by stretching, it is drawn into the tube and through it, until only a small cushion of rubber, less in diameter than the outside of the tube, remains projecting from the end of the tube opposite the slot. The thread is now slipped out of that end of the rubber and a compact and rounded little rubber tip or cushion will remain. The rubber is next pulled out of the slotted end of the tube and cut off, letting it spring

FIG. 6.



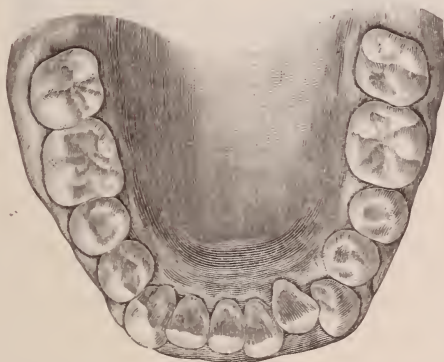
back into the tube, out of the way of the screw-driver. The cushioned screw-tube is now complete, the rubber being immovably fastened by its own elasticity, thereby filling the tube and excluding foreign substances. The power of the little rubber tip when compressed against a tooth by a turn of the screw is remarkable, but is limited by its diminutive size. Where no elasticity is required, but merely a harmless pad to protect the tooth from contact with the metal, the gutta-percha-tipped screw is made of the same tubing with a bit of wire soldered into the slot end to close it, and a piece of the hardest gutta-percha stopping packed while warm into the other end, projecting enough to form a small rounded pad. The screw may also be made of solid wire with a socket for the gutta-percha drilled into one end and the slot cut in the other. The screw tubing, with twist-drill and tap to fit, are made for me, the former in quantity, by The S. S. White Dental Mfg. Co., and with this outfit it takes

but a few minutes to drill through a rubber regulating plate at any point or in any direction, and apply a short screw to a tooth at the desired angle, following it by screws of greater length as the tooth moves out of reach. The screws should be carefully finished and smoothed at the ends, and the rubber plate should be thick enough to cover or nearly cover the slotted end of the screw to prevent injury to the tongue.

The regulation of teeth cannot be practiced according to fixed and unvarying rules, nor is there any one appliance best for all cases. Generalship is required as one difficulty after another arises, and, since a dentist must be a man of many resources, these screws are offered as additional means worthy of consideration.

After digressing to describe my screws, what I wish to emphasize in the description of this case is the fact that a great part of the

FIG. 7.



difficulty encountered, a great part of the time consumed, much of the pain and discomfort endured by the patient, and whatever of imperfection appears in the result, arose from the mistaken practice of extracting the first molars instead of the first bicuspid. Better, in such cases, if any extraction is required, take out the first bicuspid and retain the first molars at the start, even if the molars are mere shells and must for any reason be also removed after the regulation of the teeth is accomplished.

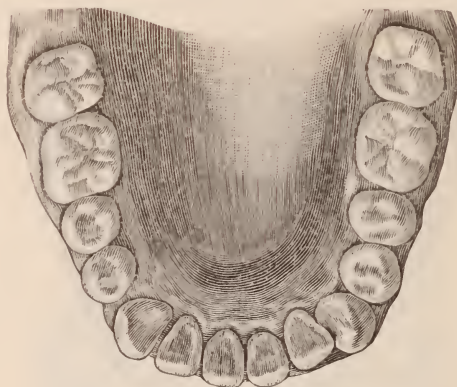
During the movement of the upper teeth, the lower teeth were also regulated, the patient wearing two plates simultaneously. The superior dental arch having been expanded, it became necessary to widen also the inferior arch in order to make good the occlusion. Hence the lower bicuspid were spread laterally by means of gold screws passing through a rubber plate and bearing upon their lingual surfaces. The cuspids were next spread laterally by means of gold springs anchored in the rubber; then all of the four incisors,



each with a screw behind it turning in the rubber plate, advanced together through the opened way. All the regulating plates were made of rubber and gold, the rubber capping those teeth to which the plates were attached; the plates going into place with a snap. They were *removed by the patient at each meal, brushed, sterilized, and kept scrupulously clean.* The first regulating plate was inserted on the 23d of November, and the retaining plates were put in place on the twelfth day of the June following, being a period of two hundred and two days for the treatment of both upper and lower teeth.

Had the upper first bicuspsids been extracted instead of the first molars, the three posterior teeth, left undisturbed on either side, would have afforded an immovable fastening for any regulating appliance. The space gained by the loss of the first bicuspsids, undi-

FIG. 8.



minished by forward movement of the teeth behind, would probably have given all the space required for the six oral teeth, after spreading the cuspids and rotating the incisors. The inferior bicuspsids being also undisturbed, it would only have been required to spread the lower cuspids and push forward the incisors, leaving the occlusion of the posterior teeth intact. Instead of moving twenty-two teeth, twelve would have been moved, a gain of ten in favor of the practice of removing the first bicuspsids. Even were the result less ideally perfect, it is better in a great majority of cases to choose the simpler method. It is better to avoid risk of profound disturbance of the general health, possible devitalization of teeth, and probable life-long disgust on the part of the patient for any form of dentistry. We are specialists, but we must not be *too special*. It was good advice given by an old dentist to his son, when beginning practice: "Remember, my boy, there is a human being at the other end of every tooth."

## PROCEEDINGS OF DENTAL SOCIETIES.

## AMERICAN DENTAL ASSOCIATION.

(Continued from page 677.)

SECOND DAY—*Morning Session.*

THE association was called to order at 9.45 A.M., President Butler in the chair.

The chair appointed Drs. Taft, Abbott, and Morgan a committee to prepare a memorial of the late Dr. F. H. Rehwinkel. [The committee reported at a subsequent session and the report was adopted.]

Section V, Materia Medica and Therapeutics, was called, and the following report was read by Dr. A. W. Harlan, chairman, Chicago:

As in former years, the greatest activity has prevailed in attempts to settle questions relating to the value of antiseptics and disinfectants in dental practice. The very elaborate report of Dr. G. V. Black read before the twenty-fifth anniversary meeting of the Chicago Dental Society most of the members present have read. This report dealt with the essential oils in particular, and their action in retarding or inhibiting the growth of microbes found in the human mouth. The above paper practically opened up the subject of the value in dental practice of the agents which, with a few minor exceptions, may be classed as non-coagulants.

Among the many cherished ideas of the practitioner of two or three decades ago was one that a therapeutic agent, used locally, should possess the property of destroying a portion, at least, of the tissue to which it was applied; or, if it did not do this absolutely, it should coagulate the surface, and produce that degree of irritation which was considered necessary to the early and quick healing of the diseased surface. This practice was conducted upon the theory that such agents were useful on soft tissues, and they were also recommended for obtunding sensitive dentine at the necks and in cavities in teeth. Such practices were even carried to the extent of trying to disinfect pulpless teeth where the pulps had long been dead and had decomposed in the teeth. The experiments above referred to, in fact, refute the idea that coagulants are necessary to accomplish the destruction of microbes. It is not denied here that coagulants are useful medicaments in dental practice, but we maintain that in the treatment of pulpless teeth for purposes of disinfection they are not only useless but detrimental; in fact, their use defeats the object sought to be obtained. They coagulate the organic surface with which they come in contact, and prevent their own diffusion. A diffusible disinfectant is constant and ever-acting. One that coagulates, cooks, or destroys is not indicated in this line of practice.

As early as 1881 the chairman of this section read before the Chicago Dental Society a paper on the value of essential oils, in which it was contended that many of them possessed potent antiseptic and disinfectant properties, as well as the property of producing a local anesthetic effect on living dentine. From that date to the present time thousands of experiments have been made by him to substantiate the claim that they were among the best, if not the best, class of agents for disinfecting pulpless teeth and the diseased tracts leading from the apices of roots forming blind abscesses and abscesses with open fistulæ. The essential oils, cassia, cinnamon, peppermint, cajuput, thyme, terebene, eucalyptus, cloves, and some of their derivatives, are among the best and most pleasant to use in the mouth. They may be combined in varying proportions to insure efficacy, and possess no disagreeable odors. The oils also deprive many nauseous and irritating drugs of their disagreeable properties, forming new compounds in some instances.

The most remarkable property possessed by the essential oils is one that has heretofore escaped general attention. The writer first pointed this out in a paper read before the Odontological Society of Great Britain in 1887. Essential oils, of the varieties mentioned above and a few others not necessary here to particularize, when introduced into a cavity of a living tooth and sealed therein, slowly deposit vaporizable camphors, which are potent antiseptics. These camphors are very sparingly soluble in water, and in consequence of this are not easily dissipated by moisture should the cavity be not hermetically sealed. The same vaporizable camphors are likewise deposited when the oils are sealed within the roots of a tooth. It is on this account that they so readily and certainly disinfect polluted dentine.

The writer wishes it distinctly understood that he believes that the dentine of a pulpless tooth—long dead, and in which the pulp or other vegetable or animal matter has decomposed—must be disinfected in order to prevent a gradual deterioration of the cementum and pericementum. This is a necessity to insure a feeling of comfort in a pulpless tooth after the root and crown have been filled. Many pulpless teeth filled and treated by purely mechanical methods, without respect to the complete disinfection of the dentine, are a permanent source of discomfort to their possessors.

Of the many agents and processes for disinfection of the dentine of a pulpless tooth, none possess so few disadvantages in the handling as the essential oils. They do not act with the instantaneous rapidity that some forms of mercury do, or even with the rapidity of hydrogen peroxide, but their action, if slower, is more perfect and continuous. The oils do not lose their property by exposure, they



do not deteriorate, and their efficacy has been established clinically as well as in laboratory experiment. To sum up their advantages in dental practice I would say—

1. They possess local anesthetic properties.
2. They are stimulants.
3. They are non-coagulants.
4. They are sparingly soluble in water, and on this account are not contaminated by saliva, food, or other foreign substances.
5. They are diffusible.
6. The camphors which are deposited when brought in contact with the slightest quantity of water, saliva, or blood-serum are vaporizable as soon as formed, at a temperature of about 94° F. Their extreme volatility permits them to thoroughly impregnate the dentine. These camphors are disinfectants in full strength, as was shown by their deposition on the sides of tubes coated with broth in which various forms of bacteria were planted. In the ends of the tubes, where the camphors were not deposited, a vigorous growth was invariably observed.
7. The vaporizable camphors are the agents which disinfect the so-called blind abscesses, even when the oil is not introduced into the root of a tooth farther than the pulp-chamber, where it is sealed only moderately tight.
8. The foul contents of a root-canal, after being in contact with the oil of cinnamon (Ceylon), oil of cassia, and eugenol for two days, when planted in sterilized beef-broth failed to show any sign of life or development at the end of fourteen days. Repetition of this experiment by planting a fresh tube daily for fourteen days failed to show any sign of bacterial life.

Dr. W. C. Barrett, Buffalo, asked Dr. Harlan the distinction between oil of cassia and oil of cinnamon.

Dr. Harlan replied that the oil of cassia was made from the bud and the oil of cinnamon from the bark of the same order of tree. Oil of cassia is the more abundant and cheaper, and it is also the most potent in its effects upon microbes.

Dr. Barrett did not understand that there was any difference between the two oils, but on the contrary he thought that they were essentially the same remedy; that oil of cassia was given to the product of a plant which grows in China, which is more plentiful than the plant from which the oil of cinnamon is made, which latter is found in Ceylon. He spoke of this because we are so apt to multiply remedies and thus breed confusion, in many cases, as in this, the same remedy being offered under different names.

Dr. W. H. Atkinson, New York, wished to emphasize the remarks

of the last speaker. By simplifying terms they are brought more readily within the comprehension of those who are being taught.

Dr. W. P. Horton, Cleveland, O., wished to know if Dr. Harlan used the two oils, of cassia and of cinnamon, separately or in combination.

Dr. Harlan replied that in his experiments they were used separately.

Section V was passed.

Section VI, Physiology and Etiology, was called, and Dr. H. A. Smith, Cincinnati, made a brief verbal report, announcing that papers by the chairman, by Dr. E. S. Talbot, of Chicago, and by Dr. Louis Ottofy, of the same place, would be read.

Dr. Smith then read the following paper on "Dental Implantation:"

At the last annual meeting of this body I presented a report upon implantation in which were given the views of a number of dentists who had implanted teeth, regarding the causes of failure, manner of attachment, etc.

Believing that the practical question now is, How long will these operations remain successful? I again addressed a series of questions to the profession with the object of obtaining statements regarding the present condition of their cases of implantation.

The oldest case of implantation reported to be in perfect condition is the one made by Dr. W. J. Younger, July 17, 1885,—more than four years ago. Between the date of this operation and November, 1885, Dr. Younger has a record of twenty-six cases.\* Of these only three were absolute failures; two were lost by accidental means; two are doubtful, yet hopeful; while nineteen are perfect. All will doubtless agree with Dr. Younger when he says, "I regard this as an exceedingly satisfactory showing, and when the conditions for success in both patient and tooth are well understood, there can be no doubt that even a *better* result will be obtained."

Dr. A. C. Hugenschmidt, of Paris, furnishes a report of six cases of implantation. The first of these operations was made early in 1888. Four, or about 67 per cent., are now in excellent condition. Two that were lost were comparatively fresh teeth when implanted, while the four successful ones were old and dried teeth, one having

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\* Dr. Younger in a note says, "I regret I cannot give a complete list of all the implantations I have performed, with the data you request, because, with three or four exceptions, I have only made record of those cases performed in my office, where a fee was charged. Those performed as practice to acquire skill in operating, those for patients of other dentists, or at clinics, I made no note of. These cases are very much in excess of those recorded in my case-book."

been out of the mouth twenty years and another twenty-five years. He thinks that the age of the tooth to be implanted has nothing to do with the success of the operation. The peridental membrane appears to be of no use, since its revivification is impossible, and if it is inserted with the implanted tooth it is sure to be absorbed and disappear, as witnessed in his second unsuccessful case.

The mode of attachment, he thinks, is a close adaptation by deposition of bone around the sterilized foreign body,—a kind of bony encystment. All of Dr. Hugenschmidt's operations were done under the influence of cocaine, introduced hypodermically, and he states with perfect success.

Of the twenty-six cases reported by Dr. Younger twelve were implanted on the day of extraction, producing nine successful cases, two doubtful, and one failure. Two implantations were made with teeth a few days old: one was successful, one failed. In the remaining twelve cases "old teeth" were used. Of these nine were successful, three failed.

The general opinion has been that fresh teeth should be used for implantation. In the report last year we quoted Dr. Geo. Cunningham, of London, as saying, "Thus far I have used only freshly extracted teeth, and believe that if a tooth is implanted before the death of the pericementum and cementum the prospect of union is increased and the loss by absorption decreased." Dr. Ottolengui also recommends that the teeth used should not be more than one week old. The data just given do not bear out the opinion of these gentlemen, since out of thirty-two cases the percentages of success with old and with fresh teeth are about equal.

Dr. Hugenschmidt states that he has abandoned the practice of implantation, at least for the present, because of the failures occurring in his practice, as well as those he has observed from the hands of some of our best operators. The immediate success of the operation depends, he thinks, upon a close adaptation of the tooth to the new socket and the observance of strict antiseptic precautions throughout. He attributes his failures to a lack of skill in forming the socket, whereby space was permitted around the root of the tooth for the development of pathogenic micro-organisms.

Dr. A. McFadyn, of California, reports thirteen cases of implantation since October, 1887, "with the most gratifying results in each." He fills the roots with chlora-percha and finishes the apex with gold. Bichloride of mercury, 2 to 1000, is used to sterilize the tooth, the instruments, and hands; Walker instruments used to prepare the socket.

Dr. G. L. Curtis reports, "I have implanted fifty teeth since October 8, 1886. When last seen or heard from, all were in a healthy



condition except eight. Two of these were lost from absorption; three from decay of crowns, leaving roots firmly attached in the jaw; two by accident, and one from overstrain due to supporting one end of a long bridge. With but few exceptions, bands or staples connected to the adjoining teeth have been used to retain the implanted teeth in position until they became attached to the jaw. The bands were usually removed in from four to eight weeks. Bichloride of mercury was used as an antiseptic, followed by phénol-sodique as a mouth-wash. Instruments known as the Younger set were used. The age of patients varied from fourteen to fifty-eight years.

Dr. W. N. Morrison reports (in a general way) twelve cases of implantation. Nine of these were dried teeth obtained from extracting houses, the others were freshly extracted teeth. The first implantation was made April 17, 1886, and all, with two exceptions, are doing well. These two, the upper right first and second bicuspids, placed in the same mouth September 28, 1887, when last heard from were still in place, but not firm. In one case the upper right cuspid stood very much inside the line of the other teeth. It was extracted and placed in a new socket in its proper position, and proved a success. The roots of all teeth implanted were filled with gold wire and chlora-percha. No trimming of the roots was done. Supporting plates of thin vulcanite were made for each case and worn continuously for thirty days, and at night and at meals for fourteen days longer.

Dr. Louis Ottofy furnishes a full report of thirty-eight cases of implantation. Of these three were repetitions, one with gold root, and two mere experiments, leaving of *bona fide* cases thirty-two. Of these, two failed by accident. Of the remaining thirty cases twenty-two are in good condition, four doubtful, and four have failed. The doubtful cases, as well also as the four failures, he states "were good cases." Hence the ratio of successes to failure is as 22 : 8, or 73 per cent. successful.

Dr. R. Ottolengui recently contributed to the literature of this subject a valuable paper,—*"Implantation Surgically Considered."* First calling attention to the importance of a thorough study of the anatomy of the maxilla by those who undertake implantation, he insists upon the adoption of the most thorough antiseptic precautions throughout the operation, and gives his methods of accomplishing this. He describes the anatomical relation of the several classes of teeth to the maxilla, and gives in detail the manner of making the operation with incisors, cuspids, bicuspids, and molars—upper and lower. To those who wish to implant teeth and who may not be able to observe the operation clinically, a study of these descriptions will prove valuable.

In this paper he relates a case of implantation of the first bicuspid, in which he accidentally penetrated the antrum while preparing the socket. The severe hemorrhage which followed evidently came from a wounded arteriole in the lining membrane of the cavity. While the tooth was in place the blood escaped through the natural opening of the antrum, dripping into the throat behind the soft palate. After a few days, serious complications arose endangering the life of the patient, and not till five weeks after the operation was restoration complete. This case is instructive inasmuch as it teaches of the possible (and with some classes of teeth the probable) danger of penetrating the antral cavity in our implantation operations.

Our statistics show a greater number of bicuspids implanted than all other teeth combined (25 to 20). It is with these teeth that the greatest danger is attended,—with the upper bicuspids of penetrating the antrum, and with the lower bicuspids of penetrating the inferior dental canal.

This danger can in a measure be overcome if the tooth is inserted shortly after extraction,—as soon as granulation-tissue has filled the socket and before much absorption of the alveolus has taken place. We then have all the conditions of success that could be present at a later period, while the danger of penetration of the antrum is lessened with a full and unabsorbed alveolus.

Shortening the root of the cion tooth also lessens the danger of accident, and it therefore is not quite clear why most implanters oppose this practice. If we assume that there is no vital attachment, that the tooth remains a passive object, the removal of the cementum and exposure of the dentine should not endanger the success of the operation, since a denser and more resistant tissue is exposed to the action of the absorbing agents.

As to the true mode of attachment to which my last report referred, I do not know that any investigations have been made since then that would throw additional light upon the subject.

It is to be regretted that so few reports were received in response to a request to furnish implantation data. It indicates either that the operation is falling into disrepute even in so short a time since the first operation was made by Dr. Younger, or that dentists are neglectful of making careful records of their cases and results. It is to be hoped, however, that enough of the older cases have been reported to assist us in forming a more intelligent opinion as to the permanency of implanted teeth.

Dr. Talbot read his paper, which was entitled "Classification of Typical Irregularities of the Maxillæ and Teeth."\*

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\* See page 762, current issue.

Dr. Ottofy read a statement of the action taken by the Illinois State Dental Society at its meeting last May in the appointment of a committee to secure a fund to defray the expense of a careful examination and tabulation, from a dental stand-point, of all the pre-historic crania in the museums of the United States. The committee has ascertained that there are more than twenty-five hundred of these crania, of which no systematic examination by scientific dentists has been made. It is proposed, as soon as a sufficient fund is guaranteed to justify the undertaking, to determine the extent, location, and character of the caries, if any; the prevalence of abrasion, erosion, alveolar abscess, and all other dental diseases which may have left some mark upon the hard structure; to inquire into dental anomalies, irregularities, the extent of dental operations; in short, to procure all the obtainable information bearing directly or indirectly on dental science. About two thousand dollars will be required. The privilege of making the examinations has been secured. Several societies have already pledged various amounts, and the committee ask that this association give such sum as it sees fit.

The hour for the special order, regarding the Dental Protective Association, having arrived, Dr. J. N. Crouse, Chicago, presented its claims to the confidence and support of the profession,\* and introduced Mr. Offield, of the firm of Offield & Towle, attorneys for the Protective Association. Mr. Offield said in substance: The dental profession should not be troubled by such claims of patent royalty as it has been and is now being forced to pay. Unless it takes some decided action and forms a permanent organization to prevent this growing evil, it will increase rather than decrease. The organization now under consideration is a move in the right direction, and the dental profession should have had such an organization twenty or thirty years ago. To discuss here, at this time, the legal aspect of the present controversy would perhaps not be wise further than to say that with the evidence we now have in our possession and with such an organization as is contemplated by the Protective Association of the United States back of us, we feel sure of absolute success in defeating the patents of this International Tooth Crown Company, and if the members of the dental profession do not all join in this movement it will be hard to understand why they do not.

The organization as now mapped out and as now managed would be hard to improve upon, and the dental profession should take hold of it in earnest and at once. Without such an organization the

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\*A copy of Dr. Crouse's remarks was promised, but up to the hour of going to press had not been received.



dental profession are defenseless in the matter of patent claims, but with the organization they are sure to have justice done them. Further than this I don't think it best to discuss what we intend to do or how we intend to do it.

A motion that one thousand dollars be appropriated to the Dental Protective Association was discussed and laid on the table.

[At the Thursday afternoon session the following preamble and resolutions were unanimously adopted :

In view of the injustice which the profession has sustained in the past, as well as the annoyances to which it may be subjected in the future, and fully appreciating the arduous and important labors of Dr. J. N. Crouse, of Chicago, be it

*Resolved*, That Dr. Crouse is entitled to the earnest and practical support of every dentist in the United States ; and further be it

*Resolved*, That the American Dental Association fully approves of the formation, the plans, and methods of the Dental Protective Association of the United States, and pledge to it our united and continued support and moral aid.

At the Thursday evening session Dr. Marshall stated that during the present meeting of the association Dr. Crouse had been served with the papers in a civil suit instituted against him by the International Tooth Crown Company to recover sixty thousand dollars damages. A number of members had circulated a subscription paper, and had obtained a large number of signatures pledging money to assist in Dr. Crouse's defense. He offered a resolution pledging one thousand dollars from the treasury of the association for the same purpose, if needed.

The resolution was seconded by Dr. T. S. Waters, and unanimously adopted by a standing vote.

At the session on Friday morning Dr. Peirce offered a supplement to the last resolution authorizing the treasurer to honor the draft of Dr. J. N. Crouse for a sum not exceeding one thousand dollars, to be used for the defense of the civil suits against him.

Adopted.]

Dr. Talbot then explained briefly the drawings which had been made to illustrate his paper.

Dr. W. C. Barrett, Buffalo, was glad that such a paper as that of Dr. Talbot's, so germane to the work of dentists, and so connected with the scientific facts which underlie dental practice, had been presented. The paper attempts to classify the different irregularities of the teeth, and goes back to the cause which produces them, but it seemed to the speaker that the causes as presented do not cover the whole ground. He has been cognizant of some cases of irregularity which do not come under any of the various classes named. He had been impressed with the number of cases in which the bite has been "jumped." We find many mouths in which the

teeth of one jaw are advanced or retrograded one step, in occlusion, so that a malposition is brought about, not by mal-development, but, as the speaker believed, by improper treatment during their formative and developmental period. Many such cases are cured by bringing the teeth in the upper jaw back just one step, other cases by advancing them the same way, and so fixing them that the proper relation shall be maintained. He believes that the factor he has mentioned is a more potent cause of irregularities than has generally been considered to be the case.

Dr. George L. Curtis, Syracuse, N. Y., did not consider himself sufficiently educated in this direction to properly discuss the paper, but he had examined, at the invitation of Dr. Talbot, the mouths of several hundred idiots, and he wished to call attention to the wonderful regularity of the lower jaw and teeth as exhibited in them. In a large majority of cases they were almost perfect and the teeth perfectly uniform.

Dr. H. J. McKellops, St. Louis, had been interested in the subject of the tabulation of pre-historic skulls for a long time. It is a hard matter to get the privilege of examining these skulls, and that the committee has succeeded in procuring it is a matter for congratulation. He moved that a committee of five be appointed to act in conjunction with the committee from the Illinois State Dental Society and others, and that they have power to select the parties to do the work.

Dr. H. A. Smith moved as an amendment that five hundred dollars be appropriated from the treasury to carry on the work.

Dr. Barrett moved to further amend by placing the action of the committee under the direction of Section VII. He was reminded by some expressions in the communication and by the tone of the discussion of the familiar quotation, "How soon are we forgotten!" Six or seven years ago he spent some time at Cambridge and tabulated two thousand ancient skulls, the result being presented before this association and published in its Transactions. Up to that time it was the almost universally accepted idea that caries was essentially a disease of modern life and due to our sins, and we sighed for the blessed time when man lived in a state of nature. That examination showed that the teeth of the ancients were affected with caries to nearly the same extent as those of the moderns. Although the paper appears to have been forgotten, it seems to have accomplished one good result. We have not since its publication heard so much about caries being a modern disease.

Dr. H. A. Smith recalled the report; but there are other things still to be done, as, for instance, an examination into the possibility of changes in conformation, irregularities, etc.

Dr. Barrett replied that he had covered that branch of the question, briefly, to be sure. He had given the number of wisdom-teeth he had found unerupted, etc., in a brief compass.

Dr. S. H. Guilford, Philadelphia. We ought to understand the situation which this proposed tabulation when completed will go far to clear up. It is important that the work be done carefully and thoroughly, and to give it the highest possible prestige, under the auspices of this association.

Dr. Barrett's amendment was adopted and the appropriation ordered.

The committee, as announced at a subsequent session, is as follows: Drs. H. A. Smith, H. J. McKellops, Louis Ottofy, W. C. Barrett, and W. Xavier Sudduth.

The secretary, Dr. Cushing, read a telegram from the American Dental Society of Europe, and, on motion of Dr. Barrett, was directed to return the fraternal greetings of this body.

Adjourned till 3 P.M.

#### *Afternoon Session.*

The association met at 3.45 P.M., President Butler in the chair.

Dr. W. W. Allport, Chicago, stated that he had been informed that the National Association of Dental Faculties had just passed a resolution requiring attendance on three full regular sessions of not less than five months each, before graduation, beginning with the session of 1891-92. He offered a resolution, which was adopted, that after the date specified no college be entitled to representation in this association that does not comply with this course of instruction.

The discussion of Dr. Talbot's paper was resumed.

Dr. P. T. Smith, Denver, Col., was much interested in the subject, which is very poorly understood so far, though so much has been written upon it. The fact that irregularities or deformities of the dental arch are common is known to all dental practitioners. The classification of the varieties is very ably set forth in the paper, which will undoubtedly be of value for reference. To know that these things do exist is to at once suggest the presumption of a cause. But what is the cause, is the question that most interests us. How are we to apply a remedy if we do not know the cause? We are not led by any of our text-books into any definite knowledge of what causes the development. It is the substance itself, the thing that is developed, that we are taught about, but we are never taken behind the screen to know how these things arise. If we could only get at the beyond, and learn what the factor is which causes the development or lack of development. We never can know the best method of treatment unless we understand the cause of these de-



flections. The essayist says that irregularities of the teeth and deformities of the jaw are more common in the demented class. That is in consonance with the idea that there is something wrong with the formative forces where such conditions occur. The formative forces govern the development, direct the processes by which the organ is made perfect or imperfect. The earthy materials which enter into the human body have no more to do with selecting the place where they are to act than have the bricks and stones used in a building. The directing power is what the speaker calls vital force. This it is that produces this perfect development when there is no interference with its normal processes. It does not commence in childhood; it does not commence at conception, but beyond the pre-natal life.

Dr. Talbot had nothing to say in reply to the remarks which his paper had called forth. It was his intention to place the models which accompanied the paper in the Army Medical Museum at Washington, there to be kept for the benefit of the dental profession.

Dr. Smith's paper on "Implantation" was then called for discussion.

Dr. Horton was glad that Dr. Younger had put himself on record, so that the subject can be more thoroughly investigated. He thinks that as much success is achieved by this operation as by most others performed by dentists. There are of course some failures in all procedures. He believes, contrary to the argument of the paper, in immediate implantation when teeth or roots are extracted to make room, a great many cases of which are successful. He has one successful case where he replanted a tooth in 1875 in the mouth of a boy aged sixteen years. The tooth was knocked out and carried in the boy's pocket for twenty-four hours. He saw the case a few days since, and the tooth looked so remarkably well that he doubted if one not conversant with the facts would suspect that it had ever been out of the mouth. Dr. Younger probably reports a higher percentage of failures than the facts demand, as the speaker is informed that many of the cases reported by Dr. Younger as failures have so pleased the patients that they never bothered themselves to report to him.

Dr. H. A. Smith replied that Dr. Horton had misunderstood the paper, which said that it was not necessary to wait a long while. As soon as granulations appear in the socket the operation can be performed.

Dr. Horton couldn't see why we should wait for granulation. Why not operate at once, and let the healing go on by first intention?

Dr. S. G. G. Watkins, Montclair, N. J., reported three cases, the first of which occurred about thirteen months since. He removed a tooth and implanted a bicuspid, which was fastened in place

with a gold staple, using bichloride of mercury solution for sterilizing. The next case was an upper lateral incisor, and the third was a lower first bicuspid, in place of one which had been extracted for some time, where it was necessary to make a new socket. All of these appear to be successful.

Dr. John S. Marshall, Chicago, thought that operations performed at once after extraction, where the teeth are placed in the old sockets, are more in the nature of replantation or transplantation than implantation. He understood Younger's operation to be intended for cases where the alveolar process has been absorbed and a socket has to be made for the tooth.

Dr. C. N. Peirce, Philadelphia. The records seem to show that in the experience of some operators teeth without periosteum are just as successful in implantation as those with it. The speaker has had no failures where the teeth used had periosteum upon them. They might have been out of the mouth for years, but the dried periosteum was still adherent to them. He makes no claim that the periosteum is revived, but it seems to have its place in the process by which the union is formed. The organic matter is absorbed and new tissue put in its place, even to the extent of penetrating the cementum as far as the prolongations of the periosteum, until there is formed a union between the root and the adjoining wall. Every tooth implanted in his experience, where there was no organic matter about the root, has been a failure, and in some cases he had afterwards placed teeth with periosteum adherent, and the operations had then been successful. That had been his experience, and he would like to know whether others had observed the same phenomena. He thinks dried periosteum as good as fresh for implantation purposes.

With reference to the danger of penetrating the antrum, he had had an experience of that character. In the last case he implanted there was considerable absorption of the process, and in making the socket he penetrated the antrum slightly. The patient came back in two days very much alarmed, and complained that he had been spitting blood. He was told that there was no danger, that the wound would heal shortly. That was three weeks ago, and the tooth is firm and the unpleasant symptoms have disappeared. Dr. Marshall used the terms properly when he said the operation should be called replantation or transplantation where the tooth is put into the socket of an extracted tooth, and implantation where a socket is made for it.

Dr. Geo. L. Curtis, Syracuse, N. Y. One of the most interesting points in connection with implantation is the question of stripping off or leaving the periosteum on the implanted tooth. He has from

the beginning reasoned that it was formed material, which would act as a foreign substance and was to be gotten rid of, and, as a consequence, from nearly every tooth (about fifty) which he has implanted he has removed it, and he has had probably as few failures as most operators. He scrapes the root clean, and he has only seen two of his cases where the root became absorbed. Two or three were lost by accident. He believes that in the majority of cases where he had failures the periosteum was left on, a fact which he thinks will account for it.

Dr. P. T. Smith has had but little experience in this direction, but he had visited Dr. Younger, and received a good deal of information from him. Dr. Younger is most particular that every possible vestige of the periosteum shall be on the tooth, and he will not accept one where an essential part of the periosteum is broken. He also insists that teeth used shall be from the mouths of healthy persons; especially is he careful that they shall not be from persons afflicted with scorbutic disease. He regards these as unfit for introduction in the mouth. He is careful in his sterilization, and cuts off the apical end of the root in proportion to the depth of the socket. In short, his success is due to his extreme care in every step. He had been shown a number of Dr. Younger's cases, and he had learned to distinguish the implanted tooth from the others by its being firmer in the jaw, from which circumstance he concludes that ankylosis has much to do with the retention of implanted teeth. Notwithstanding that Dr. Younger insists on the pericementum being *in situ*, he is not particular as to the color of the teeth which he implants, as he insists that they will assimilate in color with the others in the mouth.

The mechanical execution of the operation is not so difficult, but it is somewhat complicated, and therefore great care is necessary to avoid the omission of important details. Most of the work of the speaker in the direction of implantation has been in the way of experiments, undertaken more to see what the result would be in certain cases than with any hope of success. He has had signal failures in scrofulous persons and where the blood was poisoned. He has also experimented with sheep's teeth, and in two or three instances these have been successful so far,—a year or so,—but the work has not been done long enough to base a reliable opinion as to its permanence.

Dr. Barrett. This discussion is certainly very (?) instructive. One operator considers the presence of the pericementum essential; another invariably removes it. What are we to gather from these conflicting opinions? Most of those present have seen Dr. Younger operate, and he was not very careful, though he was successful. He



was not careful in sterilization, not even in the size of the tooth implanted, but he would cut off the end of the root, and he left the pericementum on. Now, Dr. Curtis also works skillfully. He takes off the pericementum, polishes the root because he wants it perfectly smooth, but he does not cut off the end; he is not particular as to the shape of the tooth, but he is as to the sterilization. What are we to gather from all this? Simply that we have not yet got to the bottom of it, and need to go back of all we have yet learned.

Dr. Peirce had learned a great deal from hearing Dr. Curtis, and he presumed that Dr. Curtis had also learned something from the discussion. From the statement as to Dr. Curtis's method of operating the speaker at once concluded that his failures were due to some other cause than he had attributed them to. A word as to the color of implanted teeth. Every one knows that the color is due to the fluids of the body. A tooth held in position in the jaw for six weeks without union will assume the same color as the other teeth in the mouth.

Dr. J. D. Patterson, Kansas City. How do the fluids get into the tooth? Has Dr. Peirce ever weighed freshly extracted teeth and again when they were dried?

Dr. Peirce. The fluids get there by absorption. His experience is that an implanted tooth invariably assumes the color of its fellows.

Dr. Marshall. It is a well-demonstrated fact that simple drying changes the color of a tooth.

Dr. M. L. Rhein, New York, objects to the use of the word success in connection with any of these operations. There has not yet been time for any of Dr. Younger's operations to be considered a success. The majority of dentists have seen cases of loss of teeth where replantation or transplantation was performed, and the teeth remained in place seven or eight years; but these were certainly not successes. The speaker had not performed any implantations because some years ago he had fifteen or twenty failures in replantation. The cases of failure around New York City during the last year have been much more numerous than the statistics presented would indicate to have been the case, and he protested against calling any of the operations so far performed successful. Time enough has not elapsed to demonstrate whether they are successes or failures. One of the speakers stated that one of the operators did not pay attention to the class of teeth he used, whether from a healthy person or not. He thought that of the highest importance, and that one who does not so regard it will find there is a difference if he uses a tooth from a syphilitic mouth or from one having a constitutional disease. He cannot see how it is possible that in such a case he would avoid tainting the individual operated upon.

Dr. Ottosfy's experience was that no teeth are extracted upon which the pericementum is perfect. It is invariably ruptured and a portion remains in the socket. When he first began to perform implantation, he followed Dr. Younger's instructions and did not trim the teeth, but he now finds that the trimmed teeth are just as successful as those that are not. He wanted to take issue with the statement that implanted teeth invariably assume the color of the other teeth in the mouth. That they do not he has a beautiful illustration in a mouth in which he has implanted three teeth, one of which is white, one yellow, and one brown. He is satisfied that implantation can be made successful, and we ought to consider an operation a success which has given satisfaction for a year. Patients will submit to it once a year, because of the increased comfort and satisfaction they derive from it. He has had cases where the first attempt was a failure and the second or even the third was successful. If we could tell what is the cause for failures, we could assure patients just how long an implanted tooth might be expected to last. His principal annoyance has been the crumbling of the crowns. They will chip off. He has had several cases where he has had to fill breaks of this sort with gold. To overcome this difficulty or get rid of it, he now uses a natural root with a Logan crown mounted upon it. The advantage of his present method is the perfect sterilization possible. In one case he cut off fully one-half of the root, and yet the tooth was as firmly held and in every way as successful as any in his experience.

Dr. H. A. Smith said it must be remembered that the twenty-six cases reported by Dr. Younger were those in which the operation was performed in his office. He wanted to say that he was disappointed at not receiving a larger number of reports from operators. One was handed in this morning, too late to be included in the summary.

Section VI was passed.

Section VII, Anatomy, Pathology, and Surgery, was called, and Dr. T. W. Brophy, Chicago, chairman, announced that the Section reported one paper, by the chairman. He also stated that a portion of the lantern exhibit to be given by Dr. Sudduth would be upon subjects embraced within the Section's work.

Dr. Brophy read his paper, which was entitled "Lesions of the Dental Branch of the Fifth Pair of Nerves." An abstract follows. The object of the paper was stated to be to call attention to some of the remote causes of trigeminal neuralgia, and to point out some of the more frequent nerve-lesions not dependent upon the teeth for their origin. Among the principal constitutional causes of morbid

conditions of this set of nerves are gout, rheumatism, malaria, and syphilis. Of traumatic causes, nerve-fibrils caught in cicatrices after the extraction of a tooth or other surgical operation; pressure of an exostosed tooth upon the nerve; spiculæ of bone, or particles of friable foreign bodies, imbedded in the nerve-substance; pressure of an artificial lower denture upon the terminal branches of the nerve,—this last more especially among elderly persons,—and many other causes may produce neuralgic pains, varying in intensity according to the idiosyncrasy of the patient and the climatic environment. The writer related the case of a female, aged sixty years, who complained of darting pains in the right side of the face, having their origin at the terminal branches of the fifth pair of nerves. The tissues about the mental foramen were hyperæsthetic, and there was a marked enlargement of the nerve at that point. The patient had suffered from acute neuralgic pains since the introduction of a lower denture seven years previous, during which time she had been treated by various physicians without relief. The writer diagnosed neuroma of the inferior dental nerve, induced by persistent irritation from the artificial lower denture, for which he operated, removing a section of bone from the mental foramen extending backward about an inch and a half, and removing the nerve as far back as the foramen; then reaming out the canal and surrounding tissue, he packed the cavity with iodoform, and dismissed the case. At the end of six weeks, during which the patient was comfortable, the pains returned. At a second operation the remainder of the nerve in the canal was removed, which was followed by a long period of freedom from pain, but when he last saw the patient she was suffering from pain in the tongue, indicating that the lingual branch was affected.

The cause of neuralgic pains may reside in the cranium or the brain itself, in which case it is not usually amenable to surgical treatment. Numerous cases of multiple neuromata are recorded. According to Anstie, women during utero-gestation, exhaustion from hemorrhage at parturition, menorrhagia, and sexual changes of middle life are especially prone to facial neuralgia; but the worst and most intractable examples occur in the period of degeneration. Cold winds, especially those laden with moisture, are exciting causes, as may also be injury of the nerve within a bony canal, as may occur in tooth-extraction. Tumors, abscesses, aneurisms at the base of the brain, may be the immediate cause, and in such cases a spontaneous outburst may occur without previous warning. The paroxysms may be of short or long duration, and when well pronounced the slightest irritation, as the slamming of a door, coughing, sneezing, or laughing, may produce them. The treatment is largely palliative, hypodermic injection of morphia being among the most popular. Nerve-stretch-



ing has proved a potent remedy. The writer thinks exsection should only be resorted to when medicinal treatment has failed; that is not to be relied on invariably for a permanent cure, but only to bring relief for a time.

Dr. Rhein considers that trigeminal neuralgia has received too little attention on the part of the dental profession. Though the disease is common enough, probably nine-tenths of the cases go to the physician for treatment. He wishes especially to speak of the treatment of this trouble. About four years ago Dr. Daboll introduced to his notice the use of chloride of methyl as a remedy for neuralgia, not merely as a palliative, but as a cure, which is produced by the intense cold following the exposure of the drug to the air when it is applied. He has used it in many cases, and he has yet to find one in which it does not effect immediate relief. This is remarkable, but it is true, and the fact should modify our practice. If this agent will effect a cure, why should we use morphia, or resort to nerve-stretching or the removal of the nerve? He has seen cases where the entire nerve was removed without affording the relief which follows the application of this remedy. The explanation of its operation is probably that it paralyzes the small filaments of the nerve. It has been so successful in his hands that it has taken the place in his practice of every form of palliative treatment.

Dr. Marshall. Dr. Brophy omitted one important method of treatment, namely, evulsion, the tearing up of the nerve from its attachments: an operation introduced by the French surgeons, which he has seen employed very successfully, especially in cases of neuralgia in the superior branches of the trigeminus, where one cannot cut without removing considerable bone-tissue.

Dr. P. T. Smith had had an experience with a case of neuralgia which seemed to have a peculiar cause. A lady, aged thirty-five years, suffered from pain in the left shoulder, extending up the line of the neck and down to the elbow. Sometimes the paroxysms would occur at intervals of two or three years, and again at shorter periods, and at these times the patient could obtain no relief for two or three weeks. She had been treated by physicians with constitutional and local remedies, but to no avail. She finally applied to the dentist. Every tooth appeared healthy except one, which had a small gold filling. The patient had been ptalyzed. He examined the teeth in every way he could, and only found a portion of the root of one of the molars from which he could get no response to any test. He took counsel with another dentist, who could see no foundation for thinking the cause of the pains was in this remote situation. On returning to his office the patient was seized with a

paroxysm so severe that she was almost demented. He then bored into the process at the suspected point, exposing the root, and immediate relief followed. He excised the root, which was exostosed, since which time, now some eighteen years, the patient has had no return of the trouble. He has since excised many molar roots for the cure of neuralgia.

Dr. J. R. Bell, Cleveland, O., asked, How does Dr. Rhein use the chloride of methyl?

Dr. Rhein replied that he had a paper on the application of intense cold for the cure of neuralgia, which was in the hands of one of the Sections. In that paper the method of using the agent is detailed. He had also with him a small quantity of the remedy, which is not made in this country, and only to be had from Paris.

Dr. Brophy, in closing the debate, wished again to call attention to the condition of the lower jaw in elderly persons, and to impress upon those adjusting artificial dentures in the mouths of patients of advanced years the necessity of seeing if the inferior dental nerve is enlarged at the foramen, and if so to so construct the denture as to form a saddle over it. The case which he had detailed was not the only one of the kind which had come under his observation.

The subject was then passed.

(To be continued.)

### SOUTHERN DENTAL ASSOCIATION.

THE twenty-first annual meeting of the Southern Dental Association was held in Harmony Hall, Galveston, Texas, commencing Tuesday, Aug. 20, 1889. The sessions were largely attended, nearly every Southern State being represented, and the papers and discussions formed an interesting and valuable contribution to the current literature of the profession.

#### FIRST DAY—*Morning Session.*

The session was devoted to routine business. Dr. W. S. Carruthers, of Galveston, chairman of the Committee of Arrangements, called the meeting to order, and after prayer by Rev. S. M. Bird, introduced Mayor R. L. Fulton, who in a few felicitous remarks welcomed the visitors to Galveston. Dr. John C. Storey, of Dallas, was then introduced, and extended a welcome in a brief but eloquent address on behalf of the Texas Dental Association and the dentists of Texas. Dr. George Eubank, of Birmingham, Ala., responded in fitting terms.

Dr. Carruthers then introduced Dr. J. Y. Crawford, of Nashville, Tenn., the president of the association, who read his address, in

which he took strong ground against the procuring of patents on professional appliances. No dentist, he said, has a legal or scientific right to patent a device which will simplify dental practice and sell it to his brother dentist. Referring to the agitation among the members of the dental profession over the suits which have led to the formation of the Dental Protective Association of the United States, he was sorry to have to recommend dentists to join that association. Let dentists rise in mass and with their means and their influence resist all such impositions as the Goodyear Dental Vulcanite Company of the past and the Tooth Crown Company of the present. The tendency in dentistry is toward conservatism, the saving of teeth, the saving of roots of teeth upon which good, serviceable crowns and bridges are placed. We must not sit still and see such embargoes laid upon their use.

The second subject to which he would invite attention is dental education. While he favors the elevation of the standard in the dental colleges and the improvement of the course of study, we should be slow in demanding the lengthening of the course, especially in the Southern schools. Two terms are enough. A system which is turning out the best doctors and the best dentists in the world should be continued at least a little longer. As to the idea which has been broached of overcrowding the ranks, there need be no fear. We haven't enough dentists to keep the teeth of the world clear of salivary calculus, to say nothing of filling the millions of cavities which receive no attention at all. It is a shame that the beautiful art of making a set of artificial teeth is now largely delegated to the Cheap Johns and mountebanks. We find skillful dentists turning in disgust from the laboratory, because that branch of the profession is no longer remunerative. The speaker ventured the assertion that more injury is done to the human family by unskillful extraction and insertion than by all the other improperly performed surgical operations combined. The injury wrought by the forceps has never been comprehended. Let us stop it, and make tooth-saving instead of tooth-destroying our care.

Referring to the next meeting of the American Medical Association, at Nashville, in May, 1890, the speaker commended it to the attention of dentists. Much good would result from the building up of the oral and dental surgery section in that association.

The address next considered dentistry from the hygienic standpoint. The lips are at the commencement of the nutritive process in man. The mouth is a hygienic organ whose functions have never been appreciated by medical men as a class, or even by dentists. Food received into the stomach through a filthy mouth is not in condition to form healthy blood. The most luscious fruit



passed to the stomach at once would produce paroxysms of pain, or possibly an incurable malady. It must be properly prepared, for which purpose nature has provided the complex mechanism known as the oral cavity. Dr. Crawford then traced the normal progress of the food through the mouth to the stomach, where the digestible is converted into chyle and blood to nourish the body, and the indigestible rejected and excreted. Opposed to the healthy normal act of taking food is the process when the mouth is filthy, wherein are mingled with the food the ferment of decayed alimentary particles, the gases and acids from their putrefactive decomposition, the fungi of caries, etc. Under such circumstances the food reaches the stomach in a condition which cannot be otherwise than destructive to health. He believes that the continual swallowing of micro-organisms may by their ferment activity alone produce serious disease in the stomach and alimentary canal. A clean tooth-brush and prophylactic washes properly applied by a careful hand to the mouths of those exposed or liable to croup or diphtheria will in many cases mitigate or prevent an attack. Dyspepsia is frequently, if not invariably, relieved by placing a diseased mouth in healthy condition. A diseased mouth acts on and is reacted upon by the diseased stomach. Food, even when properly masticated, if the mouth is filthy, is rendered a source of disease by being mixed with the micro-organisms from the diseased mouth. The reflex nerve action thus produced is a source of hysteria in women. The chemical composition of the fluids of the mouth shows them to be normally antiseptic and health-producing.

The teeth are the most indestructible of animal tissues. To care for them is natural and self-preservative. The dental art and science are most important and indispensable, and will bear comparison with any other department of the healing art.

The president then introduced Dr. W. W. H. Thackston, Farmville, Va., a former president of the association, who said that fifty years ago he was among the very few who favored a community of thought among dentists for the advancement of their calling in usefulness to humanity. Among his earliest efforts was the endeavor to gather the practitioners of his State into an association for the interchange of views and experiences, and he had been spared to see the present high advancement of his chosen profession, which was largely due to associated effort. We are here to-day to pour into the common treasury the advances, the improvements, the inventions of the past year. Dentistry is now on a plane coequal with medicine, with surgery, with law, with all the learned and liberal professions.

Dr. H. J. McKellops, St. Louis, also an ex-president of the asso-

ciation, was next introduced, and called attention to the proposed tabulation of the ancient skulls in the different institutions of the country, which he characterized as one of the most important scientific labors undertaken by dentists in recent years. Considerable money will be required to carry the work through, and he wished the members would contribute such aid as they could. He also called attention to the Dental Protective Association, to which he hoped every man would come forward and subscribe.

Dr. Geo. Eubank and Dr. W. W. H. Thackston were appointed chairmen *pro tem.* of the committees on education and hygiene respectively; and Dr. M. C. Marshall, Little Rock, Ark., was appointed treasurer *pro tem.*

Adjourned till 3 o'clock P.M.

#### *Afternoon Session.*

The association met pursuant to adjournment, President Crawford in the chair.

The committee on Operative Dentistry was called, and Dr. J. Rollo Knapp, New Orleans, chairman, reported verbally the papers to be read.

Dr. A. A. Beville, Waco, Texas, read a paper on "Filling Teeth," of which the following is an abstract:

The fact that while one dentist will use one kind of gold, another a different kind because he can do better work with it, and a third a still different kind, and all accomplish like results, should teach us not to condemn one who differs from us as to the manner of doing the work so long as he secures similar results. The reason for these differences is that each becomes familiar with the kind of material he prefers, and that there is not so much difference in the gold and in a great many other materials, if we only knew how to use them. Many failures are caused by trying to use too many makes of gold. The dentist should choose some good kind and stick to it. Sometimes a material is condemned chiefly because the dentist has tried it a few times and been unsuccessful, when the fault is really his own. Some condemn soft gold, but the speaker has seen beautiful fillings of non-cohesive gold which have stood the test of many years' use. He uses only Pack's crystal gold cylinders and Kearsing's universal gold blocks, and he thinks that with them he can fill any cavity which ought to be filled with gold.

In approximal cavities between the incisors, if a separation is to be made, he uses a No. 0 file, and then cuts away in front immediately over the cavity, which renders the removal of decay easy and makes a cavity that can be filled with a straight plugger. In his opinion, an operation is a failure where the tooth

turns dark around the filling and decay sets up. He has seen fine work where the tooth was cut away from the under side, but he prefers to let the gold show rather than run the risk of a bad filling made in that way. He applies the same rule to approximal cavities in bicuspid and molars, widening the cavity as he cuts back to the center, thus giving it a good retaining form. With the dam and a common matrix he can mallet in such a case as easily as in a simple crown cavity. It takes more time to shape the cavity, but less to insert the filling. Many cases in bicuspid and molars require judgment to so shape the cavity that the strain in mastication will not come on the weak parts of the walls. He uses the hand-mallet preferably in most cases, though he fills occasionally by hand-pressure.

Some teeth are better filled with amalgam or cement. All cavities caused by soft white decay should be filled with cement first. His method is to clean out the cavity as well as he can, wipe with cotton moistened with phénol camphor, fill with a plastic cement, and after it is worn off a little fill with gold or amalgam, leaving a thin lining of the cement to protect the dentine. When teeth are decayed and broken off, amalgam is better than gold. He has seen mere shells filled with amalgam doing well after twenty years' service. When an amalgam filling extends near the nerve, he lines the cavity with cement as a protection against the mercury in the amalgam.

Those who wish to can treat and cap pulps, but the writer has served his time at it, and he now destroys and removes the nerve, treats the root, and fills. Many of his root-fillings have been in twelve or thirteen years and are still doing well. After destroying the nerve, he cuts away so that he can go down into the root with a Gates-Glidden drill and clean out to the apex, or as near it as possible, then treats for a few days with a piece of cotton saturated with a mixture of carbolic acid, camphor, tincture of myrrh, and a little chloroform. When satisfied that the root is healthy, he forces a piece of spunk a little larger than a pin-head as far up the canal as he can, and then fills with Justi's cement. When the canal is much enlarged at the apex by absorption, after-trouble can be avoided by being careful not to force the spunk up too far.

Dr. C. S. Phillips, Corpus Christi, Texas, read a paper on "The Education of the Public with Regard to the Sixth-Year Molar," in which he deplored the too frequent loss through neglect of the most valuable tooth in the permanent set, owing to the popular idea that it is a temporary tooth destined to be shed soon through natural processes. As a remedy he suggested the publication, under the auspices of the dental associations, of a people's journal devoted to



the care of the teeth. By this means a large number who never visit the dentist's office would be reached.

Dr. John C. Storey, Dallas, Texas, read a paper entitled "The New Departure," of which an abstract follows:

That there are pathogenic germs from outside sources scientific investigations seem now able to demonstrate, and that the origin of all diseases may be traced to germs is within the limit of probability. The promulgation of the germ theory by Koch, followed by Miller and others, opened up a new field for observation, in which we find ourselves face to face with the destroyers of the human race. An insight into the germ theory gives us a proper understanding of the different phases which diseases assume and enables us to treat them with intelligence, recognizing the pathogenic symptoms peculiar to each as being produced by a pathogenic germ which is *sui generis*, and which only produces this particular disease. Whence the origin of the germs we are still in the dark. That they are the atmospheric vicissitudes and malaria of our fathers there remains but little doubt, and that they pervade the atmosphere of all climes and countries needs no argument to prove, and from them find their way into the system through the medium of the respiratory and digestive organs, as well as through the skin, and manifest their presence in the form of that disease which it is their peculiar province to produce. These germs may be transported from place to place in every conceivable way, as witness the fact that the physician who has the first case of puerperal fever, diphtheria, erysipelas, etc., usually has the most of them. In wounds and injuries the microbe finds a delightful habitation, and thence urges his way into the circulation and sets up that disturbance usually denominated pyemia, to which term the writer demurs, because it does not mean what it says; but such cases are growing more and more infrequent and less dangerous by reason of the antiseptic treatment. There is not a physician in the regular practice for a few years who has not seen numbers of cases that tax his powers to the utmost, cases in which he tells the patient there is only a "general debility," which demands an iron tonic. Sometimes the usual appearances are accompanied with boils. If the mouth of such a patient is examined, there will be found a perfect forest of algæ wherein hide animalcules almost as great in number and variety as the animals in the jungles of Africa. Press your finger on the gums around the necks of the teeth, and miniature lakes of pus are seen in which they live, luxuriate, and propagate their species, and from these lakes swim forth, make a detour of the system through the blood-channels, poison the vital fluid, and make life miserable if not death certain. That there is such

a disease as general debility, or that people have boils for the fun of it, admits of serious doubt. They are both chronic blood-poisoning, though the source may not always be apparent. The writer ventures the assertion that the mouth furnishes a more fruitful source than all others combined. There are few mouths in which there is not an exudation of pus from some part or other,—about an unerupted wisdom-tooth, from beneath deposits of tartar, from abscessed roots, from nasal catarrh, which in many instances is but a diseased antrum caused by the protruding root of a dead tooth, and lastly, and perhaps mostly, from badly-fitting rubber plates. Wherever there is pus there is the microbe, and these make up the general debility, and produce emboli from which spring boils and abscesses, renal troubles, exhaustion, and death. The remedy is to remove the cause and put the patient on antiseptic treatment to prevent a recurrence. Dr. Storey then instanced cases where the extraction of teeth which had been badly neglected, with antiseptic treatment, was followed by complete restoration to health of patients in an almost hopeless condition. The essay concluded with the statement that the demand of the age is a preventive and not a curative treatment of disease.

Dr. W. H. Morgan, Nashville, Tenn., while very much interested during the reading of Dr. Beville's paper, would dissent from some of the positions taken. We are justified in making the inference that when the writer said "kinds of gold" he meant the different preparations of gold. All gold is the same, whether from California, from Australia, or from South Carolina, but the various treatments to which it is subjected by the manufacturers result in the many forms in which it is offered for dentists' use. He thinks the writer a little radical in advocating dependence on one or two forms only. That depends on the man's skill and training who is to use them. He should be sufficiently eclectic to choose from any of the various preparations those which will accomplish the best results in the case in hand. The object is to make a filling which will to some extent restore the contour of the tooth, bear the strain of mastication, and the gold should be perfectly adaptable. The softest gold found in sheet-form may be so manipulated that it will wear better than the tooth-structure with which it is surrounded. It is true that such gold requires more manipulation, but it can be hardened under the burnisher, and the whole foundation of the Herbst method is that idea. He would criticise the wholesale destruction of exposed pulps advocated in the paper, because many times as good service can be had without it. It is true that the moment the vitality of the tooth is destroyed retrograde metamorphosis will set in, the crystals of the dentine will lose their cohesive power, and the tooth

will be disintegrated and lost in time. The dentine of the tooth is totally devitalized the moment the pulp is destroyed, as there is no nervous connection between the crown and the body. He had seen in the last few weeks a gentleman with teeth which had been pulpless for thirty years, and examination showed that they had become darkened. One of them has since given way. No tooth can be, after its pulp is destroyed, as good as when the pulp was in it. In many teeth there comes a time when the pulp must be destroyed, but there are cases where, even when the pulp is exposed, it may be retained with satisfaction. As an illustration, he recalled a case which occurred when he was a young practitioner. In removing the dentine in excavating a cavity he accidentally made a partial exposure of the pulp. He covered it with a small piece of gold plate and filled. In seven or eight years the filling was removed and the pulp was found alive, and there had formed a deposit of osteo-dentine. Sometimes an exposure of this sort may be covered with almost anything and the cavity filled without after-trouble. He does not think the cements as ordinarily used are the best for the purpose. You may destroy the pulp with oxyphosphate. Sometimes you may fill the cavity, putting the cement right next to the pulp, and there is no trouble apparently for some time, and you may think it all right, but an examination shows that the pulp has died and become mummified. In such cases there is no putrefaction and consequently no abscess.

Dr. J. H. Lasater, Belton, Texas, would ask Dr. Morgan if he had ever experienced any different results in the use of arsenic in devitalizing the pulps of teeth of tobacco-chewers from those of persons not addicted to the habit.

Dr. Morgan. None whatever. He had seen modifications of the result in cases of pregnancy. In that condition sometimes devitalization will not occur on the introduction of the arsenic, and more than one application is necessary.

Dr. Geo. J. Friedrichs, New Orleans, understood Dr. Morgan to say that the gold of a filling would resist mastication better than the tooth-substance with which it is surrounded. The speaker's experience was exactly the reverse of that.

Dr. Morgan rejoined that he had seen the dentine wear down all around fillings of soft gold burnished down, in a large number of cases, so that the gold stood out alone, but this is less liable to occur with cohesive than with non-cohesive gold.

Dr. Friedrichs thought Dr. Morgan's idea a mistaken one. He has seen teeth waste away without attrition, as in erosion. Why may not this be so in cases noted by Dr. Morgan?

Dr. Thackston agreed in the main with his friend from Nashville,



though some of his positions were somewhat hypercritical. Thus, Dr. Beville said that dentists should confine themselves to those forms of gold with which they can do the best work, and Dr. Morgan says, as others have said, that gold is gold; but it is a fact that all preparations of it are not the same in quality and availability. Some are tough and fibrous. Like iron, in the form of cast iron, steel, and wrought iron, various preparations of gold differ in their working qualities, and the author of the paper wisely recommended the dentist to use such as gave him the best results. It is the difference in the preparation of the gold as presented to the dentist that gives the different qualities. The speaker was educated to use soft gold, and he made his first operation fifty years ago with Abbey's soft foil, the same that is in use to-day. At his home, and he doubted not at Dr. Morgan's home, there are fillings put in then which are preserving the teeth yet. We can now do with cohesive gold what we could not do quite so well with the soft gold, as it was then called, but it is the manipulation of the manufacturer that makes the difference. So far as the preservation of the vitality of the pulp is concerned, Dr. Morgan is unquestionably and unqualifiedly right. A tooth with its pulp devitalized is not as good as when its vital power is preserved.

Dr. Morgan stated that Dr. Thackston had misquoted him in his reference to "all gold is gold." He did not say that all forms of gold are the same. They do differ, and the difference is due to the manner in which they are worked. One word as to erosion. All the authors call one stage of the malady denudation. Erosion is that form where the enamel was originally imperfectly crystallized. It will follow after certain diseases, as measles, small-pox, or scarlatina, and the experienced observer can actually tell very closely, by examination of the teeth, the time when such diseases were experienced.

Dr. Friedrichs. Dr. Morgan has said that the crystallization of the enamel where erosion occurs is imperfect. The speaker did not believe that, but that the crystallization was perfect, and by some means not known to us the structure became softened. Dr. Morgan also said the tooth was worn away and the gold stood up, but he offers no proof that the wearing was caused by attrition. The speaker has seen the densest teeth waste away when not exposed to any force. The crystallization of the tooth-substance can become denser after it has once been formed only by a process of desiccation.

Dr. H. E. Beach, Clarksville, Tenn., thought the discussion on Dr. Beville's paper as read had narrowed down to a question of the use of some particular form of gold, which treatment does not cover the questions presented. As to erosion, which has been brought into the

discussion, it is a difficult subject. As stated by Dr. Friedrichs, it is a wasting away of the substance of the tooth without the contact of anything so far as known. Every one has a theory to account for its presence, his own personal idea being that it is a chemical decomposition caused by eructations of gastric juices from the stomach. As to the wearing qualities of gold, which is a soft metal, it is a fact that Babbitt-metal is more resistive of the force of friction than case-hardened iron. Dr. Morgan is correct as to the wearing powers of gold, though the speaker would not pretend to give a reason why it is so. His practice is to cap eroded teeth with gold to stop the ravages of the disease. We lose sight of things that are of as much importance in the filling of teeth as the kind of gold. He has seen teeth which had been filled with cohesive gold where there was decay around the margins of the filling, which probably would not have occurred had the dentist used non-cohesive gold at this part of the operation. He is of the opinion that the dentist does the best service for his patients who can use both, and he does not do justice to them if he cannot. Tin foil will save teeth in many cases as well as or better than gold. A mat of tin foil covering the cervical wall of approximal cavities in molars and bicuspidis not only makes a good stopping, but its presence has a therapeutic effect on the tooth-structure which prevents the recurrence of caries, probably because the infiltration of the oxide of tin into the tubuli is destructive to animal life. Where the filling is not exposed to mechanical force, there is no material under heaven which will preserve teeth better than tin. For this reason, and because of the greatly lessened expense, it ought to be used much more than it is.

Where pulps have been suppurating he does not believe that we can cut off a portion and save the remainder, and in all our operations we ought to do what promises the greatest degree of success. In such cases as those referred to he believes in filling the canal with lead. Those who do not indorse this practice simply have not tried it. The speaker has been filling root-canals with lead for fifteen years, with gratifying success. There is no other metal with which it can be done so well as with lead. His method is to trim the lead down until it fits accurately a hole drilled through a piece of ivory with the same drill that is used to round up the root-canal, dip in any antiseptic,—he uses compound tincture of iodine,—and drive home. It makes a perfect adaptation. We would do ourselves and our patients a favor if we were to hide away the creasote bottle for about six months and just see how nicely we can get along without it. In preparing canals he washes out with alcohol to dissolve out the débris, then dresses with spirit of camphor or Listerine. Eugenol answers every purpose as an antiseptic that

creasote or carbolic acid does, and has none of its objectionable qualities, such as odor or escharotic effect.

Dr. Friedrichs. Erosion acts most singularly. Sometimes it affects only one tooth in a mouth. He could not understand how, if the cause is a chemical reaction, one tooth should be destroyed and the others not be affected.

Dr. J. E. Breeding, San Antonio, Texas, wished to concur in Dr. Beach's remarks as to filling the cervical borders of cavities with tin foil. The speaker has followed this plan for many years. He does not smooth it down, but uses it as an anchorage for the gold, which he packs into it. He has also used lead for filling root-canals, and can indorse it emphatically. His method of capping pulps is to cover with a bit of writing-paper, sterilized, and pack the cement right over it as soft as it can be used. He does not use any particular kind of cement for the purpose.

Dr. M. S. Merchant, Giddings, Texas, wished to know what the experience of others taught them as to the effect of the mercury in an amalgam filling upon the dental pulp; and he also wished to know the best method of getting a metal filling into the small buccal roots of molars.

Dr. Geo. S. Staples, Sherman, Texas. We have heard a great deal about failures,—failures at the cervical wall when this or that material was used. He is thoroughly convinced that, when there is a failure, in nine cases out of ten it is not the fault of the material. If we could see to the bottom of the cavity, we would likely find just a little disintegrated tooth-substance that causes the trouble. What is wanted is a careful hand at the instrument, so that in preparing the cavity the operator shall get down as far as the tissue should be removed, clean thoroughly, and disinfect properly, and the cavity can be filled with almost anything. The idea is all wrong that this or that material will or will not save. It is the fault of the operator; he doesn't get all around in the cavity as he ought to. The speaker had never seen a cement, unless amalgam be included in that class, which would save teeth permanently. In filling pulp-canals, if the operator gets out all the "bugs," and properly disinfects, the method or material of the filling will not matter much provided the work is well done.

Dr. Gordon White, Nashville, Tenn., was opposed to the use of tin for several years, but about four years ago he became convinced that there was something in it. The change in his ideas occurred through the extraction of a tooth in which he found a cavity of decay which had extended toward a tin filling, but stopped before reaching it. On examination, the tooth-substance between the new cavity and the tin filling was found to be very hard, indicating



apparently that there had been some action produced by the presence of the tin. Since that time he has used tin at the cervical margins of cavities very satisfactorily. The tooth-substance surrounding the tin seems, as in the case which first drew his attention to the matter, to get extremely hard. He also uses it in the corresponding portions of approximal cavities, and he does not recall a single failure.

Dr. J. N. Goolsbee, Crockett, Texas, was last year strongly in favor of capping nerves, but he had been converted. He finds he does not succeed so well as he used to, and having studied the cause he is convinced that malarial influence has something to do with it. He has adopted the practice of filling root-canals with tin and finds that it succeeds well, and he believes that the reason is that it "kills the bugs." He believes that tin is really a therapeutic agent. He fills only about one-fourth of the length of the canal with the metal, and then completes the filling with cement. One advantage of lead or tin for this use is that being soft it will follow the course of a crooked canal.

Dr. Phillips thought that Dr. Staples was joking in laying the blame for failures on himself, for the causes which produce decay once will do it again. The speaker is an advocate of nerve-capping, and prefers it decidedly to root-filling, which he considers the greatest humbug of all. He has had great success in capping nerves, his method being to use first carbolic acid, covering with Weston's non-irritant cement, completing the filling with whatever may be desirable, and he has very few complaints or failures.

Dr. E. D. Andruss, Dallas, Texas. With reference to the recurrence of decay around fillings, it is undoubtedly true that what has produced decay once will cause it again. He wished to correct an error of Dr. Beach's. Two pieces of hardened steel bearing upon one another will run longer without wear, if their contacting surfaces are true, than if they were of Babbitt-metal. This is illustrated by the fact that in dental hand-pieces the bearings are made of hardened steel. If Babbitt-metal made a more durable bearing than steel it would be used in them. As to the practice of nerve-capping, the evidence for and against seems to be almost balanced. In the speaker's practice it has been a decided failure. Where the nerve is so inflamed as to cause excruciating and prolonged pain, it cannot be restored to usefulness by any means known to him. For filling root-canals he has used lead and tin points in connection with liquid gutta-percha, and some of these fillings have done good service for eight or ten years, but he considers that the operation of filling a canal is always doubtful. In using tin for fillings at the cervical wall, we find the operation more durable when it is

used with gold than when employed by itself. He does not know if it has any chemical effect in the mouth when placed in conjunction with gold, but there is no question that it achieves the best results under such circumstances.

Dr. T. M. Milam, Washington, Ark., has said for twelve years that the dentist who would kill a nerve was a fraud. He has not killed one in that time, but keeps them all, and he only caps them with a little piece of bibulous paper.

Dr. W. J. Barton, Paris, Texas, was reminded by the discussion that when at college one of the professors used to say to the class, "Don't use gold exclusively; don't use cements exclusively: but use your judgment at all times." Teeth sometimes come to us under such circumstances and in such condition that no dentist who exercises judgment in treating them can blame himself for failing to preserve them. Much depends upon the environment. We should not confine ourselves exclusively to one material or method, but should know all and when and where to use each of them.

Dr. N. T. Shields, Galveston, Texas. Many dentists apply arsenic to pulps to destroy them when they might be preserved. The only way in which the speaker can preserve them and know they are preserved is by capping with Hill's stopping or gutta-percha. He makes a little pellet, places it on an amalgam instrument, dips in chloroform, and passes over the flame of a lamp to warm it slightly so as not to shock the nerve when it is placed in position. After it is dissolved and the chloroform evaporated, the filling is put in. He formerly dissolved the Hill's stopping in the chloroform before inserting it, but now with a piece of solid gutta-percha dipped in the chloroform as described he caps the nerve and saves it permanently by filling with thin oxyphosphate and crowning with gold. As to the buccal roots of first molars, they can be filled every time in this way. Take a Donaldson nerve-bristle and knock off the hook. This makes it into a delicate plugger with a very fine point, and wherever that point can be got a filling can also be placed. He had only found two roots in ten years which he could not fill. How is the filling to be got in? You can fill with amalgam by making it into a soft mass—it must be very soft, but must have some consistence—and working it to place. The instrument will have to be worked up and down, starting from the mouth of the canal each time. It generally requires fifteen minutes to fill a root in this manner. Of course, this method is not applicable where the roots are chronically abscessed and the foramen enlarged, because the instrument and the filling-material also will pass out of the foramen. In such cases he fills with soft foil, No. 3, by using a very small piece of rubber-dam on the plugger as an indicator.

Dr. Storey then in the presence of the association handed Dr. Shields a superior molar with crooked roots, and asked him to fill the palatal root with amalgam by the method he had described. At a subsequent session Dr. Shields presented the tooth with the root filled. He said that it would have been easy to fill it from the foramen, but he had worked the amalgam up the same as he would have had to do if the tooth had been in the mouth of a patient. The time occupied in the operation was about an hour and a half. The root was ground to show the amalgam filling as seen in the illustration after the tooth had been submitted to three members of the association.



Adjourned till 3 o'clock P.M. to morrow.

## SECOND DAY.

No regular session was held in the morning, the forenoon being devoted to clinics.

### *Afternoon Session.*

The association was called to order pursuant to adjournment, President Crawford in the chair.

The discussion of Operative Dentistry was resumed.

Dr. McKellops said that he traveled around a good deal to dental meetings, and he had no axe to grind, but did it for the good of the profession, to every movement to advance which he gave every aid in his power. To the efforts to elevate the standard of dentistry the medical profession has extended a helping hand, and everything foreshadows a bright future; but yesterday he was a little shocked when one of the speakers said that the filling of roots of teeth was a humbug, that there was nothing in it. He pitied the institution from which that young man graduated if that is the condition in which it sends out its graduates. He had thought that the status of root-filling was settled. The operation had its origin in the South, and for thirty years has been a recognized procedure. Another gentleman said he filled root-canals with amalgam. Amalgam in a dead tooth is certain destruction to it, owing to the mercury it contains. Remove an amalgam filling from a dead tooth and try to refill it, and it will break down under the instrument. Put a crown on a root with amalgam in it, and it will come off. Quack dentists who use amalgam advertise it as a "platinum" filling. [Dr. McKellops here read an advertisement in support of the last statement.] Every dental school in the country should bar amalgam out from the use of students for the first two years. The use of amalgam destroys the ambition of the student, prevents his becoming expert in gold filling, and thereby cripples his usefulness. Take the writ-



ings of all the best men in the profession of the older days,—Harris, Parmly, Crane, Tucker, Roper, Gardette, and a host of others, and not one line in favor of amalgam will be found. He defied anyone to show the slightest improvement in amalgam from that day to this, while every other branch of dentistry has advanced.

Upon the question of filling roots, the best method he has found is with gutta-percha and chloroform. With proper care, any root can be filled by this method. Take fine Swiss broaches, take out the temper by putting them in a tin box with quicklime and subjecting to heat. You have then an instrument that will go almost anywhere it is wanted to. Open the mouth of the cavity and clean out as thoroughly as possible. Don't use a drill. He had seen many teeth ruined with the drill, and it is likely to cause trouble, no matter how carefully it is used. The man does not live who can go with a drill to the end of a crooked root. After the canal is cleaned out and disinfected, introduce the dissolved gutta-percha carefully to the end of the root, pumping it up. Crooked roots can be readily filled by this method if the necessary time and care are taken.

The reflex action from the teeth is something wonderful. Neuralgias, inflammations, sore throat, deafness, etc., are not infrequently experienced, the cause of which cannot be found until a tooth is extracted having a calcified pulp. Dentists should teach their patients how to take care of the mouth properly, and to see that the teeth of their little ones are attended to. If a parent comes into your office with a child whose teeth are troubling it and says he will have the child's teeth out, let some one else take them out. Don't disgrace yourself by doing it.

He wanted to say one word for oxyphosphate of zinc. Teeth can be filled with it and kept a number of years, and that is a good result. Dr. McKellops read from a paper by Dr. S. B. Palmer an argument in favor of the use of amalgam in weak teeth, the claim being that "when porous dentine is filled with amalgam the oxide and sulphide of the metals are absorbed into the surrounding dentine, taking the place of the lime-salts and thus arresting decay." Dr. Palmer says all about the oxides and sulphides of copper, but says nothing about what the mercury will do. Oxyphosphate of zinc will do all that he claims for the copper oxides and sulphides. Take out an amalgam filling from the gingival margins of a tooth of too poor structure for the use of gold, put oxyphosphate in its place, and in time the whole structure of the tooth at that portion will be found to have changed. It will have become hardened, and a success can then be made with a gold filling. Speaking of gold, it is to be said that very little of that used by dentists is absolutely pure. Oxyphosphate of zinc is especially good in the teeth of children, but don't use

amalgam in them. When the teeth are soft, but need filling, put the oxyphosphate in for a year or more, and bring them up to twelve, thirteen, or fourteen years of age, and you will have good sound tooth-substance to work on.

Before closing, he wished to call attention to a matter in connection with the clinics which he considers radically wrong. It is not so here alone. The same trouble is found at most other meetings. Gentlemen agree to perform clinics, and they come to the meetings without anything to work with, and depend upon the depots to supply them with whatever they need. They have no business to do so, but should depend on themselves. When a man promises to clinic before an association he ought to come prepared to do the work as well as he would in his office, bringing the appliances he is accustomed to operate with. We don't want slop-shop work at clinics, but something that dentists can look on with pride and invite people in to see. In our State we formerly had the same trouble, but now records of the clinical operations are made and reported on at the next meeting. The consequence is that the men want to be seen at their best: they come prepared, and they do good work.

Dr. Phillips wished to explain that he did not intend to say that the filling of roots *per se* was a humbug, but that there was more humbuggery about it than there is in any other branch of practice.

Dr. Friedrichs. If what Dr. McKellops says is true, we are not progressing. If those present did not know the virtues of oxychloride, there is small hope for them. If you will read Garretson, you will see that he especially emphasizes the point that in oxychloride fillings it is the material which hardens the dentine and removes the sensitiveness; that after an oxychloride filling has been in place in a soft tooth for a year, it can be removed and a gold filling inserted. The only difficulty with an oxychloride filling is that it will soften out near the gingival border; but if the patient can be seen and the filling guarded against that contingency, you can accomplish all that Dr. McKellops has claimed. The speaker's only astonishment is that there is a dentist who doesn't know it. He thought it was patent to every man. At least there is no excuse for any man not to know a fact that has been published as this has been.

The speaker has been disgusted with the discussion on root-filling, with its iteration and reiteration of what has been said over and over again. Every man has his own method of performing the work, with which he is or ought to be successful. His own practice is to cauterize the pulp, cut a piece of lead so it will not press on the pulp, guard it, if he can, antiseptically, and fill.

One other point, as to being prepared to perform clinical operations. He had always been opposed to clinics at dental association meetings, and only indorsed them when there was something new to be shown; but to be asked to clinic on the subject of cylinder fillings, which has been before the profession for fifty years, was unexpected to him. When dentists come to his office while a patient is in the chair, he invites them to come into the operating-room and see the method. At the clinic, however, he was unprepared to do the work, and he paid dearly for it, as it took nearly two hours to do what ought to have occupied three-quarters of an hour, though he thought the operation would be satisfactory. He hoped no member here would ever have to make excuses.

Dr. D. R. Stubblefield, Nashville, Tenn., thought the discussion, which had been branching off from the subject of Dr. Beville's paper, ought to be kept in the track. One point in the paper seems to have been overlooked: Dr. Beville said that after cleaning out the canal as clearly as possible, he pressed a piece of spunk saturated with camphor and carbolic acid up to the apex, and then completed the filling. It seems to the speaker to be always incorrect to leave a porous substance in the root permanently. It is just as capable of absorbing gases there as ever, and of thus possibly producing a center from which trouble may arise. An absorbent will become saturated with whatever gaseous or liquid mass it is surrounded. He would differ with Dr. McKellops when he says that he can fill root-canals by injecting gutta-percha dissolved in chloroform. The canal can be filled, and the material forced through the foramen and cause the patient to flinch, but you can't prove that a compound with a volatile element will remain solid in the canal. The volatile chloroform will evaporate and leave the filling more or less porous or shrunken, so that it does not fill the canal accurately. Some roots will take care of themselves; others will kick up a row, no matter how they are treated. His own idea of the best way to fill roots is to enlarge the canal with enlightened judgment, as uniformly and accurately as possible. The porous dentine should be removed as much as possible, and then a piece of malleable lead be driven home.

Dr. McKellops would ask Dr. Stubblefield if he had ever tried the method with gutta-percha and chloroform.

Dr. Stubblefield. Only experimentally.

Dr. McKellops has known men all over the world who have filled by the plan he advocates, and he has yet to see it fail when proper care and judgment were exercised. He only asked a trial of the method, satisfied that its merits will win favor every time. The filling is solid.



Dr. Morgan thinks Dr. McKellops has forgotten the practice of a few leading men, as for instance Dr. Westcott, who never filled roots, and he claimed to have success with them. If you will dissolve some gutta-percha in chloroform in a vial, and then allow the chloroform to evaporate, you will see that Dr. Stubblefield is right as to the porosity of the residuum.

As to amalgam, the speaker was in practice many years before he knew how to make an amalgam filling, and was on the stage of action when the great fight over it was made. Amalgam is not, as a rule, destructive to tooth-structure, more especially the enamel. Many makes of it do not stain the teeth. The fillings sometimes turn very dark, but there is no stain of the tooth-structure.

Dr. Storey used to cap pulps and try to save them, but found it an unsatisfactory undertaking. Now, and for many years back, it has been his practice when a pulp was exposed or had ached to immediately expose it if not already accessible, and cap with arsenic, which he removed after allowing it to remain twenty-four hours, and then opened up the pulp-chamber. With a little pledget of cotton dipped in camphor or carbolic acid—being careful not to use too much carbolic acid—he treated it each day. In a week the pulp was all sloughed out and he was ready to fill the root. He doesn't want anything better than a Donaldson broach to clean out the canal, and as for a filling-material he feels as he would in going shooting: if he has a gun that has never failed him, why should he hunt around for something else? He has not for many years used anything else but oxychloride of zinc. He uses it first, last, and all the time, and he has not had a single failure in fifteen years,—at least he has not heard of one. He had used oxyphosphate in a few cases, and since the last meeting of the association he has seen a failure among these. The material gummed and failed to reach the proper point. For getting the oxychloride up the canal he uses a Donaldson bristle from which he has sand-papered the barbs.

In filling cavities of decay he uses more or less amalgam, for three reasons: first, because he is sometimes tired and it is easy to insert; second, for economy; and third, because he extracted a tooth several years ago that had been filled with amalgam twenty-nine years before.

Dr. B. Holly Smith, Jr., Baltimore. We have heard in the discussions nothing but methods, methods, methods, while the principles which underlie practice have been entirely ignored. It doesn't seem to make much difference what roots are filled with, provided the work is well done. At the anniversary meeting of the Odontological Society of Pennsylvania, Dr. James Truman read a paper in which he combated the filling of roots with cotton, and several prominent dentists stated in the discussion which followed that it

had been their practice for years. The speaker challenged any man who had opened a tooth with a gutta-percha root-filling to deny that it was so foul smelling as to be disgusting. As he had before said, it does not make any difference what roots are filled with so it is done right. Where failures occur, in the large majority of cases they are the fault of the operator.

Dr. Beach thought the discussion had developed the fact that exposed pulps can be capped with almost any material, provided it is the one with which the individual operator is successful. If this is true, let each stick to the method he succeeds by. The principle upon which success is founded is, as suggested by Dr. Smith, thoroughness. It does not make much difference what we fill roots with if it is not something liable to be destructive in itself.

Dr. Beville, in closing the discussion, said that he had nothing to add to what was stated in the paper. Many object to the methods which he uses; let them go on in their own way, if they are successful, for that, after all, is what we are after, and he was simply detailing the methods which had produced the best results in his hands.

The subject of Operative Dentistry was passed.

(To be continued.)

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The annual election was held Friday afternoon.

Atlanta, Ga., was selected as the place for the next meeting, and the date was fixed for the third Tuesday in July, 1890.

The following officers were elected: John C. Storey, Dallas, Texas, president; B. Holly Smith, Jr., Baltimore, Md., first vice-president; Gordon White, Nashville, Tenn., second vice-president; E. E. Spinks, Meridian, Miss., third vice-president; D. R. Stubblefield, Nashville, Tenn., corresponding secretary; M. C. Marshall, Little Rock, Ark., recording secretary; Henry E. Beach, Clarksville, Tenn., treasurer; S. G. Holland, Atlanta, and E. F. Adair, Harmony Grove, Ga., members of the executive committee.

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## TEXAS DENTAL ASSOCIATION.

OUT of compliment to the selection by the Southern Dental Association of Galveston as the place of its meeting this year, the Texas Dental Association postponed its ninth annual session so as to meet with the former.

Separate sessions of the State association were held at the Tremont Hotel, commencing August 19, 1889, only for the transaction of necessary business, all papers and discussions on scientific questions being presented to the visiting association. Dr. W. J. Barton, of

Paris, presided with dignity and efficiency. The meetings were largely attended.

The more important matters despatched were, the adoption of a resolution recommending every dentist to become a member of the Dental Protective Association of the United States; and the appointment of a committee of three, consisting of Drs. John C. Storey, of Dallas, S. E. Jones, Houston, and J. H. Grant, Palestine, to look after amendments to the dental law of the State.

The following gentlemen were elected honorary members: J. W. White, M.D., D.D.S., Philadelphia, Pa.; H. J. McKellops, D.D.S., St. Louis, Mo.; B. Holly Smith, Jr., M.D., D.D.S., Baltimore, M.D.; W. H. Morgan, M.D., D.D.S., and J. Y. Crawford, M.D., D.D.S., Nashville, Tenn.; W. W. H. Thackston, D.D.S., Farmville, Va.; J. P. Gundry, M.D., Dallas, and C. W. Truebart, Galveston.

At the close of the meeting Dr. George M. Patten, who for several years had been the very efficient secretary of the association, was presented with a gold cane on retiring from the office, to which he declined a re-election.

The following officers were chosen for the ensuing year: M. S. Read, Corsicana, president; J. H. Grant, Palestine, first vice-president; T. H. Lipscomb, Galveston, second vice-president; C. B. Lewis, Dallas, secretary and treasurer; W. J. Barton, J. E. Breeding, and J. H. Grant, executive committee.

Belton, which was to have been the place of meeting this year, was selected for next year.

The association adjourned to meet at Belton on the first Tuesday in May, 1890.

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### MISSOURI STATE DENTAL ASSOCIATION.

THE twenty-fifth annual meeting of the Missouri State Dental Association was held at Pertle Springs, Warrensburg, Mo., July 9 to 12, inclusive, 1889. The following officers were elected for the ensuing year: Henry Fisher, president; J. D. Patterson, first vice-president; J. P. Gray, second vice-president; John G. Harper, recording secretary; William Conrad, corresponding secretary; James A. Price, treasurer; J. F. McWilliams, W. L. Reed, and W. H. Buckley, executive committee; T. M. Nicholson, J. W. Whipple, and J. G. Hollingsworth, board of censors.

The next annual meeting will be held at Pertle Springs, Warrensburg, Mo., commencing the first Tuesday after July 4, 1890.

WM. CONRAD, *Corresponding Secretary*,  
321 N. Grand ave., St. Louis, Mo.



### WESTERN ILLINOIS DENTAL SOCIETY.

THE fourth annual meeting of the Western Illinois Dental Society will be held in Bushwell, Tuesday and Wednesday, October 22 and 23, 1889.

The executive committee has prepared an excellent programme, and a full attendance of members and all dentists in the district is desired.

A. H. McCANDLESS, *Secretary*,  
Rock Island, Ill.

### SOUTHERN MINNESOTA DENTAL SOCIETY.

THE semi-annual meeting of the Southern Minnesota Dental Society will be held in Zumbrota, Minn., October 15 and 16, 1889.

H. L. CRUTTENDEN, Northfield, Minn.

### UNION DENTAL CONVENTION.

THE twenty-first annual union meeting of the Fifth, Sixth, Seventh, and Eighth District Dental Societies of the State of New York will be held in Stancliff Hall, Elmira, N. Y., Tuesday and Wednesday, October 29 and 30, 1889, under the auspices of the Sixth District.

The papers, discussions, clinics, and exhibits will be of very practical interest to all, and it is hoped every dentist residing within the confine of the several districts will be present. Those wishing to make exhibits should apply to Dr. F. B. Darby, Chairman Committee of Arrangements, Elmira, N. Y.

MYRON D. JEWELL, *Chairman Business Committee*,  
Richfield Springs, N. Y.

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## EDITORIAL.

### THE DENTAL PROTECTIVE ASSOCIATION.

IT is evident that no little misapprehension exists in the minds of the profession concerning the objects and methods of this association. Upon the one hand, there are those who seem to indulge the idea that included in the purposes of the association is an attempt to evade or break down all patents which interfere with the right to use any device or method which may be thought to be of value in the practice of dentistry. On the other hand, there are some who seem to look upon any attempt to investigate and determine the validity of any claim to an exclusive right to the manufacture, sale, or license of any appliance or process to be an unwarranted, illegitimate, and dangerous conflict with governmental prerogatives.

In this connection, however, it should be understood that a notable distinction is to be made between the unauthorized manufacture, sale, or use of a patented article, or the employment of a patented process, and a legal resistance to what is deemed an indefensible claim.

There are still others who, recognizing the right of an individual to contest the validity of a patent, are deterred from uniting with others in such an effort because of the fear that they may thus make themselves liable to a charge of conspiracy.

There can be no question as to the legal liability of anyone who either ignorantly or designedly infringes the patent-right of another, no matter if the individual thus infringing is absolutely certain that the invention was made by himself or another prior to the date of the application of the patentee.

In the case of large manufacturers and where an article is, or is likely to be, in such demand that great profits are to be anticipated, the risk of suit is sometimes assumed in the belief that such proof may be furnished on trial as will lead to a judicial decision against the validity of the patent.

In the case, however, of a patent covering a device or a principle which in the very nature of things cannot be manufactured in quantity but must be made or applied to individual cases, the burden of a legal contest is so far out of proportion to the possible profits that the patentee has it all his own way. Under such circumstances there are three courses open to those whose interests are interfered with by a patent-right: to dispense with its application, to submit to the requirements of the patentee with whatever pecuniary loss and inconvenience and sense of injustice and injury may be involved in such submission, or to combine with others alike interested to contest in a lawful and equitable manner the claims which in his and their estimation should be declared invalid on presentation of known facts to the court.

Such combinations are comparatively rare, because of the rarity of patent-rights which bear so uncomfortably upon so large a number of individuals as do those which relate to any device or method applicable to prosthetic dentistry. But such a combination is as natural and as proper as any other co-operative organization whose object is to resist a public wrong; as for instance societies to protect children or animals from cruelty, or to secure a faithful performance of contracts in cities whose paid officials are deemed incompetent or unfaithful.

It is not necessary in such contests that the parties who feel themselves aggrieved should make themselves amenable in the civil or criminal courts, nor are they liable to such action so long as they

simply unite their strength to contest in a lawful and equitable manner the validity of any patent whatsoever which affects their interests.

With reference to certain dental patents the claims under which are now being enforced to the dissatisfaction of the dental profession throughout the United States, the problem for each practitioner is whether he will accept the situation and calmly submit to what he deems an unjust exaction, whether he will ignore the patentees and assume single-handed the risk of so doing, or whether he will unite with his brethren similarly situated and contribute toward a fund for the employment of counsel to contest in a lawful and equitable manner any and every patent the validity of which is deemed fairly questionable.

### INDEPENDENT *vs.* TRADE JOURNALISM.

A STORY is told of an individual who, seated in his carriage driving along a country road, accosted a little bare-legged girl with the question, "Do all the girls in this neighborhood go bare-legged?" To which the little Miss replied, "Some of them do, and the rest mind their own business." We respectfully refer the editor of the *International Dental Journal* to this incident as conveying a lesson which it would do him no harm to consider.

In the September issue of that journal the editor, under the heading as above, sets forth the objects and methods of its publishers. So far he is within legitimate lines; but not content with this, he has chosen from his own stand-point to represent the motives as well as the methods of the company publisher of the DENTAL COSMOS as per the following paragraph:

They are not engaged in journalism from philanthropic motives,—simply from the love of it: nor do they lose sight of the fact that journalism is only a minor part of their business. With them journalism consists in steering skillfully their craft over the shoals, avoiding as many rocks as possible, for rocks represent customers, and to hit them too hard or too frequently might seriously interfere with the footings up of the ledger at the end of the year. Their main idea is to make as few enemies and to sell as many dollars' worth of goods as possible. An aggressive journalism would be inimical to such a policy and need not be looked for.

The ostensible reason for two pages of editorial of this character is the allegation that the DENTAL COSMOS has "steered clear of the fight" between the Dental Protective Association and the International Tooth Crown Company.

The *Journal* says, "The matter was also presented to the Cosmos with the request that the printed circular should be published. . . . The question was taken under advisement, and after a time a short



extract of the circular appeared without editorial comment either for or against."

This alleged neglect of the Cosmos is offset by a boast of the very different course pursued by the *Journal*. What will be thought of the fact that the only two circulars authorized by the directors of the association, of which we have knowledge, have never appeared in the reading-pages of the *International Journal*, although they each had two insertions in its advertising columns?

We take this opportunity to advise the editor of the *Journal* that the way to success in journalism is not in detraction of his contemporaries, but in the attainment of an unquestionable superiority in style and matter, in an effort for which we should be glad to count him as an honest and generous rival. We exceedingly dislike personal controversies with contemporary journals, but when an editor deliberately and repeatedly goes out of his way to criticise the conduct of the DENTAL COSMOS and to assign motives therefor, we submit that he violates the rules of polite journalism, and invites the hint that he had better attend to his own business and let other people's alone.

The course of the DENTAL COSMOS needs no defense or apology. It has given its readers all the information needed concerning the Dental Protective Association, and the editorial on that subject as it appears in the current number was in type before the issue of the journal whose uncalled-for remarks we have quoted.

The DENTAL COSMOS is not "the organ of the Dental Protective Association," as the *International Journal* claims to be, nor is it the organ of any society or of any association. Its record for thirty years is before the profession, and its character is so well established that it will require something more than the impudent criticisms of the editor aforesaid to lessen the confidence of its nearly eight thousand readers. While it is not uncommon for a neophyte to be over-zealous, there can be no excuse for deliberate and officious intermeddling and misrepresentation.

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### THE DENTIST IN CHINA.

SOMEWHAT more than two thousand years ago the art of making hard porcelain was invented in China at Sin Ping, and the place has ever since been famous for its porcelain potteries, although its fame did not reach England until about the fourteenth century, and the product was then termed China ware.

Crude imitations of natural tooth-crowns in porcelain for use as dental substitutes were made in France as early as 1774, and introduced into this country in 1818.

The fact that primarily we are indebted to the Chinaman for "China teeth" was the thought with which we began to write a brief notice of the following fact.

Dr. Robert Ivy, of Shanghai, has just informed us that his partner, Dr. H. Mason Perkins, has been appointed "Private and Official Dentist" to Li Hung Chang, the viceroy, or chief counselor to the emperor of more than 400,000,000 people, who constitute the Chinese empire, at once the oldest continuous government and the most extensive and exclusive nation on the globe. There is, therefore, a notable significance in the official recognition of the American dentist by the Chinese premier, who thus introduces to his Oriental compeers and countrymen a representative of the youngest profession from the newest nation of the Occident.

At all points the Chinese wall of prejudice seems to be giving way before the advance of the forces of modern civilization, and it is no small honor that dentistry has so early obtained governmental recognition.

That the work has only begun, and that progress will be slow and unremunerative in the dental field, seems evident from what Dr. Hall, of Shanghai, said before the American Dental Association at its last meeting, as reported in the DENTAL COSMOS for September, page 676. There are, nevertheless, great possibilities in such an immense country and among a people so numerous, persistent, ingenious, and well educated in many matters.

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### THE SOUTHERN DENTAL ASSOCIATION.

THE annual meeting of this body held recently in Galveston was well attended, and its sessions were conducted in a dignified manner. The papers and discussions were of about the average in merit.

A noticeable feature was the fraternal spirit which was manifested throughout the meeting, and the absence of the political element and the strife for office which sometimes engenders a bitterness of rivalry sadly interfering with scientific work and spirit.

The clinical demonstrations were largely attended, and proved a constant source of interest to the members.

The Committee of Arrangements seemed to have done everything in their power to make the meeting a success, and to insure the comfort and enjoyment of those in attendance.

A report of the meeting, papers, and discussions commenced in this issue of the DENTAL COSMOS will be continued in successive numbers.

## THE AMERICAN PUBLIC HEALTH ASSOCIATION.

THE seventeenth annual meeting of this association will be held in Brooklyn, N. Y., October 22 to 25 of this year, and the list of topics is as follows:

- I. The Causes and Prevention of Infant Mortality.
- II. Railway Sanitation.
- III. Steamship Sanitation.
- IV. Methods of Scientific Cooking.
- V. Yellow Fever.
- VI. The Prevention and Restriction of Tuberculosis in Man.
- VII. Methods of Prevention of Diphtheria, with Results of such Methods.
- VIII. How far should Health Authorities be permitted to apply known Preventive Measures for the Control of Diphtheria?
- IX. Compulsory Vaccination.
- X. Sanitation of Asylums, Prisons, Jails, and other Eleemosynary Institutions.

The dental as well as the medical profession has a direct interest in the objects of this association, and we therefore publish this notice, calling especial attention to the first topic, and wishing that due consideration may be given to the diseases incident to the first dentition as among the most common and withal preventable causes of infant mortality. The extreme simplicity and certainty of the remedial measures to be adopted by the physician or dentist of anything like modern proficiency and skill in discerning the signs and symptoms of dental disturbances in infants ought to command a most earnest and thoughtful public expression on the part of this scientific and progressive association. Dr. J. H. Raymond, No. 173 Joralemon street, Brooklyn, will furnish further information as to subdivisions of topics, and the exhibition of sanitary appliances, etc.

## AN ARRANGEMENT WITH DR. MILLER.

WE take pleasure in announcing that we have completed arrangements for the exclusive publication of the reports of the scientific work of Dr. W. D. Miller, of Berlin, in the DENTAL COSMOS. These papers will be illustrated by drawings made under the immediate supervision of Dr. Miller.

Two papers are now in preparation,—one on the antiseptic action of filling-materials, and one on the anatomy and histology of ivory in normal and pathological conditions, their practical bearing on diseased conditions of dentine, etc.

The readers of the DENTAL COSMOS are to be congratulated on



the opportunity which will thus be afforded them of enjoying the fruits of the researches and labors of this distinguished scientist.

### AN ENCOURAGING REPORT.

THE Alabama State Board of Dental Examiners in its annual report thus refers to one of the graduates of the dental department of Central Tennessee College:

Among all of the applicants was one colored man, bearing a diploma from the Meharry Medical and Dental College of Nashville, who stood a most excellent examination in all dental branches, greatly to the surprise of every member of the board. We mention this case especially as being the first among the colored race to don the professional gown in Alabama; and we hope the brotherhood will extend to him all reasonable professional courtesies and a helping hand, as a vast field is opened for his services in our Southland.

### DR. GARRETSON'S PHILOSOPHICAL LECTURES.

THE J. B. Lippincott Company have nearly ready for issue a volume of over two hundred and fifty pages which contains the matter of the philosophical lectures delivered last winter by Dr. James E. Garretson. The title of the book is "Man and his World." A photograph by Gutekunst is to accompany the work.

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## OBITUARY.

### CHARLES SPENCE BATE.

DIED, at his residence at Rock, Plymouth, England, July 29, 1889, of cancer of the bowels, CHARLES SPENCE BATE, F.R.S., L.D.S.

Mr. Bate was descended from an old Plymouth family, his father before him having been a well-known and respected dentist, whom the son joined in practice. He rapidly gained a great reputation in dentistry both as a practitioner and writer on dental subjects. He was vice-president of Section XII (Diseases of the Teeth) at the International Medical Congress held in London in 1881; was president of the British Dental Association in 1883, and of the Odontological Society of Great Britain in 1885. He was essentially a man of progress and reform in dentistry, and always had a word of encouragement for the young members of the profession.

Mr. Bate was not alone a dentist, however, as his writings on scientific subjects attest, his work on Sessile-eyed Crustaceans having won for him his fellowship in the Royal Society. He was, moreover, an artist of no little skill, and at the time of his decease was an active member of the Plymouth Fine Art Society.

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### DR. CALVIN REED TAFT.

DIED, at Wyoming, near Cincinnati, Ohio, June 15, 1889, of cerebral paralysis, C. R. TAFT, D.D.S., in the sixtieth year of his age.

Dr. Taft was born October 23, 1829. He studied dentistry with his older brother, Dr. Jonathan Taft, and was a graduate of the Ohio College of Dental Surgery. He was at the date of his demise president of the college board of trustees.

Dr. Taft was exceptionally skillful and thorough in every department of dental practice, and was intellectually equipped for great professional advancements. He had responded promptly to the danger-call of his country, and in its service suffered such physical impairment as induced the disease which caused his death. His professional brethren in Cincinnati have unitedly attested his worth as dentist, citizen, and friend. He leaves a widow; their only child, a son, having died in infancy.

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### DR. NATHANIEL EMMONS.

DR. NATHANIEL EMMONS, who died in Valparaiso, Chile, June 30, 1889, was one of the best-known dentists in South America. His father was a practicing dentist of Delaware, Ohio, where he attained a high reputation for his professional skill. At an early age Dr.

Emmons went to California, and made the acquaintance there of Dr. Brunet, now of Paris, who had determined upon establishing himself in Chile, South America. Dr. Emmons decided to accompany him. They settled in Valparaiso, and for a period of ten years were the leading dentists of that city. Subsequently Dr. Emmons removed to Santiago, the capital, where he formed a business association with the writer which continued for four years.

Having accumulated a competency, he returned to the United States in 1878, intending to remain here permanently, but business reverses soon after induced him to return to Valparaiso, where his established reputation soon gained him a large practice. His superior skill as an operator was always recognized by his fellow-practitioners in Chile, and he merited special commendation for the painstaking and conscientious care that universally characterized his work. I feel justified in referring to him in the highest terms in this respect, based on an intimacy with his methods during the four years of our copartnership. It is a gratification to be thus able to pay him the highest professional tribute that can be paid to one of our profession.

Socially he was a genial, kind-hearted gentleman.

HADDONFIELD, N. J.

C. E. EDWARDS.

## PERISCOPE.

**INFLUENCE OF MICRO-ORGANISMS IN CARIES OF THE TEETH.**—I have seen recently in *The Microscope* a reference to a paper by Dr. W. D. Miller, of Berlin, in which he advocates the theory that micro-organisms are to a large extent the cause of caries of the teeth.

The writer seemed to indorse his (Miller's) views.

I have seen Dr. Miller's paper on the subject, and think some of his statements rather remarkable. I thought it no harm to bring the subject before the society. I did not think his reasons for holding such an opinion sufficiently convincing. I do not dispute but that various species of bacteria may and do produce disease, but in many cases they are merely the accidental accompaniment of disease. I think caries of the teeth is one. As to their being able to cause decay of a tissue containing such an excess of inorganic matter as the teeth, especially in the way he points out, is hardly probable.

I was inclined to class his discovery along with many others that have come to us from beyond the sea, such as fossil organisms in meteorites, the reticulum, homeopathy, mesmerism, phrenology, etc. I would not have you think that I am of the opinion that all real discoveries, everything that is genuine, must have originated in my own country. I recognize the fact that many of our greatest scientists, especially pathologists, chemists, etc., are to be found on the other side. I have not forgotten Virchow, Heckel, and many others whose names might be mentioned. But it is a curious fact



that from Germany come at the same time some of our greatest discoveries and greatest humbugs in science. It has been truly said, "Superstition forever lurks about the camp-fires of science." And it really seems, too, that often we seize an idea more because it is novel than because of any substantial proof in its favor.

My objections to the germ theory of caries are the following: 1st. The earthly material is dissolved out long before the organic portion of the tooth is broken down. A microscopic examination of a tooth, with even a low-powered objective, will show this to be the case; whereas an organism operating upon the tooth would destroy the organic portion of the tooth first, and removal of the lime-salts would be merely incidental, and the diseased portion of the tooth would lose all structure. This, however, is not the case until long after the inorganic part is gone. 2d. It is not likely that an organism so simple in its organization as bacteria could subsist and reproduce itself so rapidly as they, and still have force enough left to perform a work requiring so much energy as the destruction of tissue like the teeth is composed of, the hardest in the body, and that would be of so little use to them. For they could not appropriate the earthy material, and the rest of the tissue would afford but little nourishment. 3d. An artificially decalcified tooth presents about the same appearance under the microscope as a carious one would. Like causes produce like effects.

Dr. Miller quotes from A. Weil in saying that a species of bacteria—*leptothrix buccalis*—bores directly through Nasmyth's membrane into the enamel. What for? It certainly seems strange that these minute and soft-bodied organisms, without organs of special function, so far as we know, could sink a shaft into a tissue like the enamel, where there is only about from three to five per cent. of organic matter. They could certainly do better on the outside. These organisms must subsist while doing their evil work; and the enamel is the hardest tissue of the body. But right here Miller goes on to say, "These organisms attack first the organic material, and, feeding upon it, create an acid which removes the lime-salts." It would seem that a large quantity of acid is generated from the small quantity of organic material contained in a tooth,—about twenty-five per cent. at most. But unfortunately the "organic material" is the last to be destroyed. His statement is not borne out by an examination of the tooth. The statement of A. Weil, from whom he quotes, certainly does not agree with his idea. Weil seems to think these organisms are created expressly to bore holes in the enamel of human teeth, and have no need of subsistence: a sort of biological perpetual motion.

Miller says, "The ordinary course of the disease is this: Enormous masses of fungi, *leptothrix* threads, bacilli, micrococci, etc., work their way into the deeper parts of the softened dentine, stop up the dental tubuli, or destroy the dental fibrils; the outer layers of dentine consequently receive no further nourishment, lose all vitality, and fall a prey to putrefaction." Now you will observe that before "the ordinary course" begins the work has been accomplished. That is, the tissue has been softened, the lime-salts are gone. According to his own saying, there is already caries of the teeth.

After these leptothrix have penetrated so deep, the tissue must already have been destroyed. Stopping up the dental tubuli can do no harm.

This is the method used by dentists to arrest decay: cut off all communication with the outside, and the more perfectly the work is done the more effectually is the object accomplished.

That such organisms are found in cavities of carious teeth cannot be denied. But that they do or can have any considerable effect upon the normal tissues of the teeth in producing disease there is no evidence.

Here is one of Dr. Miller's experiments: He places a freshly extracted tooth in concentrated carbolic acid, and after the space of one hour finds it quivering with living organisms. This is certainly the work of his imagination. Who could expect (knowing the nature of carbolic acid) to find signs of life in any organism after having been drowned in carbolic acid? But Dr. Miller says he has seen motion, quivering. He should certainly know that it could not be on account of any form of life known on this planet. He thinks it showed that the fungi had penetrated to an extreme depth. Surely the "quivering" must be accounted for in some other way. Such statements seem to detract from the value of his conclusions.

Here is another discovery: "The leptothrix threads contain granules of starch." This conclusion is reached by the application of the same test as was used by Drs. Leber and Rottenstein\* (iodine and sulphuric acid) in their test for fungi, when their presence could not be satisfactorily determined without. But they do not claim it indicates the presence of starch; and botanists pretty generally agree that starch is not found in plants other than those containing chlorophyle, and that the presence of the latter, together with sunlight, is necessary for the manufacture of starch. What the starch-bearing fungus has to do with caries he does not say, but would it not have a great deal to do with the value of his conclusions generally? It would certainly be a fine thing to discover granules of starch in these minute organisms; and if they were there, it would be for use of the plant, not to ferment an acid for cutting the teeth.

Dr. Miller thinks he has seen bacilli in the dental tubuli. What he has seen I am convinced is nothing more than the contents of the tubules shrunk by the reagents he used so as to break into nodules, which being stained might be mistaken for an organism of that kind.

This investigator says, "I have been able to obtain sufficiently thin sections of fresh dentine in an advanced stage of decomposition to observe and study the action of the fungi and see the tubules filled with micro-organisms in active motion." He must certainly be mistaken, for even if he succeeded in getting his sections without destroying all life, the liquids he would have to use to produce sufficient transparency would destroy the life of any species of fungi. Besides, a staining fluid would be necessary to show such organisms, and such as are used for staining bacteria are fatal to life. He

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\* Leber and Rottenstein on dental caries and its causes. Translated by T. H. Chandler, D. M. D.

describes but one method of preparing his specimens, which, while it is good enough for all ordinary purposes, would destroy the life of any species of bacteria.

It is the ordinary method of preparing such objects for the microscope. He passes them from alcohol to the staining fluid, then to the mounting medium. The very first step would kill. There are, I admit, cases on record of some very highly organized beings able to withstand large quantities of that liquid when taken internally, but when applied to the outside in any considerable quantity it is fatal. Might it not be that Dr. Miller has mistaken a glimmer that sometimes comes before the eyes on looking through the microscope, for living organisms?

He finally claims to have met with one kind of fungi, "which, beyond all doubt, has the power of boring directly into sound dentine." He says, "It appears to generate an acid upon its growing extremity by means of which it eats its way into the hardest dentine." And what is more wonderful, it does not even follow the dental tubuli, but cuts across in any direction, preferring the most impossible method. This is a very remarkable discovery. It would be interesting to know how he succeeds in observing these specimens alive, and in distinguishing a growing extremity from the extremity that does not grow. Transmitted light is necessary even to see them at all, and the difficulty would be greater in case of such sections as these, for the earthy matter has not been dissolved out; therefore the preparations would not be as transparent as in the case of microtome sections. Besides, this fungi must certainly be a unicellular plant. In such a case it would grow in all parts alike, and not having organs of special function, one part would look like another. Nor is there a chance to divide an object so small into extremities. It would be interesting to know in what respect it differed, one extremity from another. This is certainly a new species, and Dr. Miller should have given us an accurate description of all its parts.

Another difficulty is the acid that is given off at the growing extremity. How could he determine it to be an acid, or see a flow of liquid from an object so small? He must have a good microscope.

I have examined a great many sections of teeth, from perfectly sound teeth to all stages of decay, but have never seen anything like microfungi in any part except the structureless material taken from the cavities of carious teeth. Of course this is only negative evidence, but there is a quantity of it.

A hard section of a tooth was placed in a bottle containing some distilled water and infected with decomposing organic matter. An examination was made from time to time. Bacteria at certain stages were found in abundance, but the tooth-section remained unaffected; no micro-organisms were to be found within its tissue, and the surface retained its polish. Even the small amount of organic matter it contained was no temptation to these desperadoes.

It is well known that after death decomposition soon sets in in the soft parts, but the last to succumb to the action of the elements are the teeth. Then it is in the mouth only that the conditions exist favorable to decay. If bacteria or other organisms have anything to do with the process, why not do the work out of the mouth,



especially when the conditions most favorable for their existence are arranged?

My conclusion is that caries of the teeth is entirely a chemical process.

The predisposing causes of caries are (1) inherited defects in the structure, such as flaws and extreme thinness in the enamel, especially on approximal surfaces and in the crevices of molars and bicuspids, where fluids are held by capillary attraction. (2) One other matter to be taken into consideration is the influence of impact in developing the shape, proportions, and structure of the teeth. Everyone knows that exercise is essential to a healthy or proper development of the muscles. No one doubts but that the strength of the arm of the blacksmith is due, to a large extent, to the exercise it receives. Few, however, stop to consider that upon a similar influence depends the character of a tissue like the teeth. E. D. Cope has pointed out the effect of "impact and strains on the feet of mammalia," in a paper read before the National Academy of Science. He says, "There is every reason to believe that shocks, if not too severe, encourage growth in the direction applied."

I fully indorse what he says there, and will add that such influence determines the character of the tissue in the parts so influenced. Apply this to the teeth. Note the size and strength of the incisors of the rodentia; the cuspids of carnivorous animals, also the rudimentary nature of their incisors. Now there can be no doubt but use is the cause of the excessive development in the first case, and want of use the cause of the rudimentary condition of the latter. Now how does this apply in a pathological sense? It seems to me this will show the necessity of perfect articulation.

A tooth that is not opposed by another tooth must always be deficient in structure, and will always lack the proper quantity of earthy matter. In other words, it is soft and soon becomes affected with caries. It is a very unobserving dentist who has not noted that perfect articulation is essential to a healthy condition of the teeth. The reason is clear. The influence of "impact" has developed the structure and caused a proper deposit of earthy material where the articulation is perfect, so as to harden the tissues and thus increase their power of resistance to the action of acids.

This being the case, any abnormal condition that would prevent a perfect articulation is to be considered a predisposing cause of caries.

The active or immediate cause of caries is nothing more or less than the various acids either taken into the mouth as food or with the food, or generated there. Most acids that find their way into the mouth are injurious to the teeth, such as fruit acids, vinegar, lactic acid, and acids may be generated in the mouth that will act upon the teeth; but whatever influence fungi may have in this, if any, would be indirect and comes from the decomposing food material, and not from the tissue of the teeth.

The saliva, which is generally alkaline, plays a part in softening and loosening the remaining organic material (which is, of course, dead after the acid has done its work), exposing fresh surfaces to the action of acids. This makes the process somewhat alternate. First a dissolving out of the lime-salts, then loosening and breaking up of the organic material, etc.

At first the process is slow ; but as advance is made, the cavity becoming larger, its capacity for holding liquids and decomposing particles of food is greater ; the inner part of the tooth containing less and less earthy material, the process becomes more and more rapid until the pulp is reached, which, not being able to withstand the sudden changes of temperature it is now subjected to, soon dies.—*F. O. Jacobs, D.D.S., Newark, O.; Read before the Ohio State Microscopical Society ; The Microscope, June, 1889.*

**NATIONAL ASSOCIATION OF DENTAL FACULTIES.**—This association met at Saratoga Springs on August 6, 7, and 8. Out of twenty-eight dental colleges, eighteen were represented by delegates, representing institutions which were pledged to abide by the action of the association.

The delegates adopted resolutions requiring the colleges to exact an examination preliminary to matriculation, and compelling the students to attend a three years' graded course. The resolutions passed by a two-thirds vote, which was subsequently made unanimous. They are to take effect from the beginning of the winter term in 1891-92. This date was adopted as a concession to the schools which are departments of medical colleges, whose course extends only over two years, and was designed to give these institutions time to lengthen their course of medical study. These were almost the only opponents of the resolutions.

It will thus be seen that the dental profession has taken a decided step in advance ; one which places it ahead of the profession of medicine, and in fact puts the latter into the position of requiring less time for the study of the whole science and art of healing than modern dentists demand for the acquiring of a small portion of the same art. The action of the association will be indorsed by all the dental colleges. In fact, they will be practically compelled to do so, as dental boards exist in many States, which are united in an Association of Dental Examiners. This body has the power of forcing any recalcitrant college into conformity with its requirements by refusing to recognize its diplomas without examination. A Baltimore college defied the association for one year, but was glad to come into the fold before the opening of the next term.

The Association of Dental Faculties has been in existence for five years, and in that short period has accomplished three decided reforms in dental education. First, it put a stop to the practice of allowing practitioners of five years' standing to enter the graduating class. Then it established the graded course, with preliminary and junior examinations ; and finally it has instituted the great reform herein recorded. One result of this action will be to increase by one-half the cost of the dentist's course of instruction, as the same body regulates the fees to be charged at dental colleges, and the student has now to pay for three terms.

It will thus be seen that the dental profession is much better organized than the medical, and that this is made possible largely through the influence of legislative enactments ; further, that this has made possible an advance in dental education which could not have been secured otherwise, as the weaker schools would have held back those desirous of lengthening the course. The difficulties in

the way of procuring suitable legislation are much less in dentistry, as there are no homeopathic or eclectic dentists.—*The Times and Register*.

**SPASMUS NUTANS IN DENTITION.**—Dr. E. Tordens's out-patient class in Brussels has been afforded the opportunity of seeing a case of spasmus nutans, or *tic de salaam*. This is not a very common affection, but several examples are mentioned by Henoch in his Lectures on Children's Diseases. The Brussels case was that of a little girl of ten months, still at the breast. She had been very healthy, and was fairly robust. A month previously to her admission the mother had noticed a slight but nearly constant nodding motion of the head. When examined for the first time the chief motion was rotatory; the eyes also rolled from side to side, especially when the head was held. There were two teeth. The child was treated with oxide of zinc and bromide of potassium. The next time the patient was brought, a fortnight later, but little improvement could be detected, and a nodding motion was added to the lateral oscillation. Afterwards, however, improvement commenced, and at the end of six weeks from the first visit the child was quite well. By that time she had cut two new teeth. There could be little doubt that the affection was a complication, though a rare one, of dentition.—*The Lancet*.

**CHLOROFORM AS AN INTERNAL REMEDY.**—Dr. Stepp, of Nürnberg, noting the observations of Salkowski on the disinfecting power of chloroform water, determined to make trial of chloroform internally in a considerable number of diseases. In gastric ulcer Dr. Stepp gave chloroform (fifteen grains in a five-ounce bismuth mixture) with great effect, and believes this to be due to its disinfecting, astringent, and stimulating properties. In various affections of the mouth and throat—as follicular pharyngitis, catarrh of the pharynx, gingivitis, and diphtheria—washes and gargles containing chloroform proved very beneficial. In one case of severe psoriasis of the mucous membrane of the mouth, which had been unsuccessfully treated by several medical men, chloroform water effected a complete cure.—*Lancet*, March 9, 1889.

**AN ANTISEPTIC SOLUTION.**—Under the title of "An Ideal Antiseptic," Dr. Rotter, in the June number of the *Gazette de Gynéc.*, gives the following formula:

Corrosive sublimate.....	5 parts.
Chloride of sodium.....	25 "
Phenic acid.....	200 "
Chloride of zinc	}      āā 500 "
Sulphocarbonate of zinc }	
Boric acid.....	300 "
Salicylic acid.....	60 "
Thymol	}      āā 10 "
Citric acid }	
Water.....	100,000 " —M.

If a weak solution be required, the sublimate and the phenic acid may be omitted. The above solution will not injure instruments.—*Medical News*.



## HINTS AND QUERIES.

WILL some reader of the Cosmos tell if there has been a case in which a graduate in medicine has been prosecuted for practicing dentistry? When, where, and result.—M. D.

TO THE EDITOR OF THE DENTAL COSMOS:

*Sir*,—In "Hints and Queries" of the DENTAL COSMOS for November (1888) it was asked why persons ought not to sleep with false teeth. In addition to what has been said in that respect, I think the following reasons may be given:

The natural state of the mucous membrane of the mouth is to be uncovered, and covering it with a plate (nearly always of a bad conducting substance) excludes the air, which is necessary to its health.

The continuous pressure exercised by the plate on the mucous membrane interferes with the normal circulation of the blood.

It also interferes with the shedding of the epithelial cells.

The particles of food, together with the exudations of the mucous membrane, favor the development of microbes.

The pressure exercised by the plate on the mucous membrane causes an irritation of the parts.

A plate which is not frequently removed acquires a very disagreeable odor.

If the plate is small and not clasped (as in partial cases), there is the risk of its being swallowed.

If the plate has clasps, the probability is that the longer the remaining teeth are in contact with the clasps the sooner will they be lost.—J. FALERO, D.D.S., City of Mexico, August 14, 1889.

LEAKAGE OF VULCANIZERS.—I have heard several dentists complain of leakage of the Mann vulcanizer, but never had any trouble with it myself until about three months ago, when the one I had in use commenced to leak in the packing, and continued to leak until on one occasion the climax was reached, the water having all "fizzled" out, and my coolage regulator ceased to work. Fortunately I discovered it in time and saved burning the plate. I could not conceive why a packing held by the center should not be as tight as when held by the edge, as in the Whitney and others, the only difference being in the rotary motion which the covers of the latter have. Acting upon this idea, I wet the edge of the vulcanizer and rotated the cover a few times, then fastened in the usual way. It has not leaked since, and requires but a very moderate pressure with the wrench. It seems necessary to rotate the top in order to rub off the bunches in the packing. I use ordinary stick stove-polish or whiting. Instead of observing the position of the arrows to mark a uniform position of the cover, I think it better to stop the cover at a different point each time. I have no doubt that others have been inconvenienced in like manner, and that this hint will enable them to avoid such trouble in future.—P. B. LASKEY.

TO THE EDITOR OF THE DENTAL COSMOS:

*Sir*,—I have a cast of a case which is almost a duplicate of Dr. Richey's anomaly in the September Cosmos, but it is on the left side of the mouth, and the twin bicuspid occupies the place of the first bicuspid, yet their relative positions are the same as those illustrated: that is, the palatine face of the outer and the buccal face of the inner tooth present toward the median line. All three of the bicuspid are of normal size and form.—J. W. FOREMAN, Norfolk, Va.

# A MONTHLY BIBLIOGRAPHY OF DENTAL LITERATURE.

COMPILED BY J. MELVÍN LAMB, M.D., WASHINGTON, D.C.

This bibliography will be continued monthly in the DENTAL COSMOS, and will furnish as complete a record of dental literature as can be gleaned from current periodicals and transactions of societies.

The abbreviations of titles used are those common to bibliographical work, and will, it is presumed, be readily comprehended by any one familiar with dental or scientific publications. Any explanation will be gladly furnished by the compiler.

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**Roth.** Klinische Terminologie mit

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## ORIGINAL COMMUNICATIONS.

### DENTAL EDUCATION.

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No subject is, to us, of greater importance than that on which depend the character and qualifications of those who are entering and shall enter our ranks. Pecuniarily, we are benefited by lack of trustworthiness and ability in those who come into the profession; for, the fewer the honorable and capable men, the greater the demand for their services. But there is in us a professional pride which leads us to set aside, in this matter, pecuniary considerations. And it is not only pride which impels us to seek the elevation of our profession; there is also, urging in the same direction, the desire for the welfare of the laity—that desire whose strength is known to every professional man, and unknown to those who are beyond the bounds of the professions. These impulses, by increasing the usefulness of the profession, promote the general good; they are, therefore, right,—that is, conducive to social welfare. We ought to seek, as we do seek, not our selfish pecuniary good, but the elevation of our profession. And the primary means to this desired and desirable end is dental education.

There is more to be said. Our impulses, in seeking the elevation of our profession, are not selfish. Yet we should not altogether consult our selfish interests by suffering our profession to decline. We should make money by holding a monopoly of professional ability and integrity; but, as the status of the individual depends largely on that of his calling, we must personally feel the effects of the degradation of the profession to which we belong. Both altruistically and egoistically, then, education is a subject of primary importance.

Such is my apology for the length of the present paper. Or, rather, such is the *motive* of my apology. Its *reason* is the inchoate condition, at the present time, of educational science. The non-

existence of a science of education, or rather the existence of such science only in its nebulous beginning, renders it necessary to lay down with some fullness the basis of discussion, and thus to give to the present paper a length which, if educational science were recognized and studied like medical science, might be avoided. Now, my apology presented, I turn to my subject.

Education is a practical matter. Consideration of practical subjects has two natural divisions or parts,—consideration of the end, and consideration of the means. We must first know what we want to accomplish. Then we may proceed to consider the means of its accomplishment.

First, then, the end. What is it which is sought by dental education? Plainly, to make dentists.

What is a dentist? This question, I believe, has never been answered. There are dental colleges in operation in all parts of the country, but we have as yet had no description or characterization of the article which they produce. No criterion has yet been given by which we may judge—may recognize the dentist in the first place, and appraise his dental value in the second.

For our present purpose a criterion is necessary. In order to know the end or object of dental education, we must know what a dentist is. And our knowledge must be clear—definite. It will not do to rest content with saying that a dentist is a specialist in medicine; we must go on to note what a specialist in medicine is. In a word, we need, not a synonymous definition, but an analytical definition.

The dentist is a person who cares for the teeth. I say "cares for" rather than "treats," because a large share of dental effort is prophylactic rather than restorative; and "cares for" embraces "treats," as the whole includes a part. The dentist, then, is a "doctor" in the true sense of the word—a "teacher;" his function is "cure" in the original sense—*cura*, "care." The object of dental education must be to produce such a person—a "doctor," capable of general "care."

The dentist, then, is an adviser. He is a man of the same class as the architect or the attorney—a man who does more than merely execute the will of his client—a man who advises, by reason of superior wisdom.

Is the dentist only this? No. He is an adviser, certainly; but he is more than an adviser. Dr. Bonwill says that the fundamental principles of dentistry are mainly mechanical. This statement is too strong; but it expresses a truth. The dentist is, like the general surgeon, a mechanic.

An adviser and a mechanic—such is the dentist. Such is every

surgeon, general and special. But the dentist is, in common with the surgeon, something more; he is a therapist. Even beyond this, the dentist is something; he is something which the general surgeon is not; he is an artist.

Let us rearrange this matter. We have seen that the dentist is adviser, mechanic, therapist, and artist, and we have spoken of the last three characters as if they were separate from the first. In fact, however, no separation exists. It is as mechanic, therapist, and artist that the dentist is an adviser, and he can only competently advise through familiarity with the principles of mechanics, therapeutics, and esthetics. (Surgical mechanics includes, of course, as its basis, human anatomy.)

But in mechanics, therapeutics, and esthetics there are two classes of men. There are those who direct, and those who execute. There are the advisers, and the workers. We find the two in the machine-shop; there is the mechanical engineer, and there is the machinist. We find the two in the sick-room; there is the physician who prescribes, and there is the nurse who applies the remedies. We find the two, less widely separated but still showing some distinctness, in the studio; there is the artist, and there is the painter. In some cases the two classes have become so distinct as scarcely to come together at all. The architect advises; the carpenter executes. The navigator advises; the sailor executes. In dentistry, and indeed in other departments of surgery, no marked separation of the two classes has taken place. This differentiation may be one of the great professional advances of the future; but at present the dentist both advises and operates. He is mechanic, therapist, and artist, and in all these capacities he both directs and works; he is, in everything, both adviser and executor.

Such is the dentist. He is both adviser and operator. He is mechanic, therapist, and artist. But he is more even than this. As operator, he is mechanic, therapist, and artist. As adviser, he is, in addition, necessarily, biologist and sociologist. His advice must be largely based on biological principles; and scarcely less largely must he, in giving that advice, consider social principles.

Such being the dentist, the proper object of dental education is the production of such a person. Now, having seen with sufficient fullness for preliminary purposes the end of dental education, we may proceed to consider the means to this end.

A rational man, being about to build a boat, devotes his first attention to the securing of proper timber. He submits such timber as presents itself to a searching examination. This examination is not so conducted as to determine the foliage of the tree; it determines that which is of importance for the object in view,—the fitness



of the timber for boat-building. It is desirable that there should be ascertained, with regard to timber which presents itself for conversion into dentists, not the extent to which it is ornate with scholastic learning, but the extent to which it has the requisite properties for dentist-making,—mechanical genius, therapeutic aptitude, and artistic intuition, together with capacity for biological and sociological attainments.

The choosing of timber presupposes a knowledge not only of the result desired, but also of the character or qualities of timber. The fashioning of the timber presupposes a further knowledge. An acquaintance with human nature, comparable with the boat-builder's acquaintance with timber, must here be assumed. It is true that few possess this knowledge. The noblest study of mankind is man; but it is a neglected study. Yet knowledge of man must here be taken for granted, because this is not the place for an analysis of man—a delineation of human nature. It must suffice, here, to say that, for our present purpose, we have to consider man as a fourfold entity, consisting of: 1, a general physique, to be respected, if not developed; 2, a set of active members; 3, a series of impulses; 4, a guiding intellect. All detail with regard to these four sections of human nature must be assumed as known.

There is, in man, a fifth department, which must receive mention. This is the department of sensation—the senses. But sense-education, though a most important part of dental teaching, and though as such properly requiring separate consideration, will here, for brevity, be merged with manual and intellectual instruction.

The dentist who is lacking in general physique is not necessarily a poor dentist. His activity is limited by the limit of his physical power; but the dentist's need of a good physique is not different from that of the average man. This section of the field we may therefore neglect, as pertaining to general, rather than to dental, education.

The organs of activity require, for the production of the dentist, special training. There is required, by the dentist, a special readiness of manipulation. There is required a practical familiarity with certain special instruments and with certain special operations. In a word, there is needed, for the production of the dentist, special teaching in the use of the limbs in general, and of the hands in particular.

The impulses of man—the feelings or sentiments—require, for the production of the dentist, special cultivation. There is required, by the adviser, an unselfishness, a thoughtfulness for the good of others, in which the average man is deficient. There is required an *esprit de corps* or professional feeling, which must be developed.

There is required a firmness, and at the same time a pitying regard for human weakness, only to be obtained as the result of teaching.

The intellect—the guide of life—requires, for the production of the dentist, special development. There is needed, in the dentist, a special body of intellectual knowledge. There is needed, in the dentist, a special power of intellectual judgment. These are to be given by dental education.

There are, then, three great departments of dental education,—the manual, the emotional, the intellectual. Which of these should, in point of time, have precedence?

As intellect is the guide of action, we may incline to educate the intellect before giving manual education. And, as feeling is the basis of intellect, we may conclude that the emotional education ought to precede the intellectual. In these beliefs we should not be wholly wrong. But when we consider the facts that intellect is based on activity and that the higher sentiments are based on intellect, we shall rather decide to reverse the order of procedure.

Practically, the latter conclusion is the true one. For, in education, regard must be had, not to the functions of the faculties after they are developed, but to the means of their development. In the beginning, action, intellect, and sentiment develop together, and their education should begin together. But there is a higher intellectual development, which succeeds the period of greatest and most varied activity, and on which depends the fullest development of the feelings.

Manual education, then, should come first. It must, of course, be accompanied by a certain amount of intellectual information. But the main body of intellectual education should come, not prematurely, but when the student is prepared for it. The child learns to make a fire. He learns, intellectually, that he should lay paper in the stove, that he should place wood upon the paper and coal upon the wood, that he should close the stove, that he should open the damper, that he should rub the head of a match, that he should ignite the materials at the lowest point. He learns, in short, how to make a fire—intellectually, indeed, but the intellectual knowledge is only a brief authoritative guide to the performance of an operation. Later, the child learns more. He learns that air expands when heated, that gravity determines the descent of cold air and consequently the ascent of heated air, that air consists of oxygen and nitrogen, that oxygen combines with the carbon and hydrogen of combustible materials, that friction produces heat, that the velocity of gases in a chimney depends on their composition and temperature together with the height of the column. He learns, in short, why he makes the fire in a certain way; and, learning this, he ceases to be a slave bound to a particular routine and becomes a master in the

art of fire-making, and he also becomes a capable judge of fire-places and chimneys. Mark, now, what the child learns. He learns *how*, and he learns *why*. The former is the lowest phase of intellectual education; the latter, the highest. The former is the necessary accompaniment of the routine art of fire-making; the latter is the basis of wide-ranging judgment.

Suppose, now, that, instead of commencing with manual education, we seek to commence with intellectual teaching. Instead of *showing* the child *how*, suppose we *tell* it *why*. We lecture the child on oxygen and nitrogen and chemical affinity and expansion by heat and attraction of gravitation and correlation of forces. The child perhaps listens, if compelled to, and repeats after us, parrot-like, what we have said. But what has the child learned? Nothing. He has taken in the intellectual aliment which we have forced, with a stick, into his intellectual stomach; but he has no power to digest it. Like the foolish mother who feeds the child with amylaceous food before the salivary and pancreatic glands have developed their complete functions, we have, in our bungling effort to give intellectual nourishment, produced intellectual indigestion and perhaps inflicted permanent injury. The child needed milk; we have given it a stone.

Skill is the parent, not the child, of knowledge. The human intellect owes its origin to the human hand. This is the primitive truth, and as such is of first importance. But it is here stated as introductory to and explanatory of a secondary truth which bears more directly on dental education. This is the truth that the primary faculty is the first to reach maturity—that high manual skill should be secured before giving to intellect its highest cultivation. I am, at present, not disputing; I am simply stating the “first principles” of educational science as these relate to dental education; I am laying the foundation for future disputation. I have mentioned the order of instruction merely because of the necessity of so doing—because, without this, a statement of the principles which underlie dental education would be unpardonably defective. But I may note in passing (as I shall not have occasion to recur to this matter in the critical or controversial portion of the present paper) that the natural order of education has an important bearing on the subject-matter of the great educational dispute now raging between the two sections of our profession, the advocates of learning and the advocates of skill. The party of intellect is pointing out the miseries which result from the ignorance of “mere mechanics who are practicing dentistry,” and is urging higher intellectual education; the party of skill points out the miseries which result from defective manipulation, and urges more thorough manual education. In this dispute, both parties are right; the error of each is merely in sup-



posing that the other is wrong. But the two truths cannot be reconciled without considering the order of instruction;—as is evident from facts which have come to light during the discussion—the facts that the unpractical “educated” book-man cannot be converted into even a decent dentist, and that the best dentists (certainly the best operators) are largely men who have had, before taking up their distinctively dental studies, a preliminary manual education, usually in some trade.

I must not be understood as saying that manual instruction should be completed before intellectual instruction is begun. The two should begin together and should progress together. Indeed, the interrelations of the two are such that they cannot be wholly separated. My aim has been to show, not that intellectual instruction should be denied to the incipient dental student, but that manual instruction should be the main item with the novice, and intellectual education the main item of the maturer stage.

Intellectual instruction, when the intellectual stage is reached, should be the main item. It is not enough that the dentist should know *how*; he should also know *why*. A cutting criticism, applicable both to dentistry and to general surgery, was made in my presence a few days ago, and made with a naïveté which indicated a complete lack of intention to be severe; it was the remark (how often true!), “What a pity that so fine an operation should have been performed with such poor judgment!”

The dentist should know *why*. He should be more than a machine, to do the bidding of the patient. He should be an adviser. He should possess judgment—and this, not only as to the manner of his operations, but also as to their desirability, and furthermore as to matters, both therapeutic and hygienic, which concern the welfare of the patient, whether such matters attend his operations or lie beyond them.

It is true that, in the eyes of the ignorant public (or, more properly, the ignorant portion of the public), the dentist is little more than a tooth-filler; just as, in the estimation of this same ignorant public, the physician is only a dose-compounder. But neither general medicine nor dentistry must permit its character to be determined by the ignorant public to which it ministers. The dentist should be what he is called—a doctor or teacher—a man of knowledge—a guide to his patients, who, necessarily, know little either as to the advisability of an operation, as to its character, or as to the therapeutic or hygienic requirements of their own cases. In a word, the dentist should know, and should know fully, what the patient cannot possibly know,—that is, *what is best for the patient*.

Turning back, let us glance at intellectual education as a whole. That is, including sense-education and the intellectual department of manual instruction, let us note the main divisions of the intellectual field. Two of these sections we have seen,—the *how* and the *why*. A third section must now be brought into view. This is the *what*.

The *what*, the *how*, the *why*—these are the divisions of the intellectual field of dental education. The student must learn the *what*,—the anatomy of the parts, the semeia of disease. He must learn the *how*,—the manner of obtaining access to a cavity, the way to correct a tendency to hyperemia of the tooth-pulp. He must learn the *why*,—the rational indications for the employment of plastics, the reasons for conserving here and for removing there.

But intellectual education has another factor. The student should be given something more than a mere body of learning. That body must be rendered useful. There must be breathed into it the breath of life. There must be not only intellectual mass; there must be also intellectual action. The student must not be merely crammed with learning; he must be taught to use that learning. There must be, not merely intellectual food; there must be intellectual exercise.

Dead learning is worse than no learning. For ignorance is a mere nonentity, while dead learning is a burden. I do not say this for the purpose of discouraging wide and varied learning. I say it for the purpose of indicating, by antithesis of results, the character of true intellectual education—that which produces, not intellectual obesity, but intellectual power. I say it for the purpose of indicating, or rather emphasizing the importance of, the second main factor of intellectual education (a factor which, in professional schools, is too often neglected).—the conversion of barren *learning* into useful *knowledge*. I might indeed say it for the purpose of discouraging indiscriminate cram; for there is a limit to every student's capacity for mental development, just as there is a limit to his capacity for physical development; and to attempt to force him beyond his limit by cramming him with food, mental or physical, is arrant folly—is not merely not beneficial, but is positively injurious. But, though desiring, for reasons which will in due time appear, to bring forward the truth that "cramming" is physiologically wrong, I am here engaged in presenting the active side of intellectual education, whose basis is the fact that intellectual ability is capacity for intellectual *action*.

Next comes emotional education—not in point of time, but as matter for consideration. In point of time, emotional education should be first begun, and continued to the last. Of its numerous

sections, those which here require mention relate to one phase of personal and two of social instinct.

The personal instinct referred to is the love of achievement, and, to this end, of application. Education should teach the dental student: first, to study; second, to practice. The former item is more important than the latter, as the root is more important than the branch; but hitherto it has been implied rather than mentioned, for the reason that one main object of general education, and almost the sole object of "liberal" education, ought to be (though, I believe, it never is) to teach men to study. Our subject being, not general education, but dental education, it was assumed at the outset that the student came to it with open eyes—desirous and capable of observing clearly, experimenting decisively, and reasoning correctly, and consequently needing no teaching in the art of study except such special training as is required for the formation of sound judgment in dental matters. But, if the average man ought to be, in a limited sense, a student, the professional man should be, in the fullest sense, a student,—study being the function which, in the social differentiation, is committed specially to him. Therefore, though, through desire to reduce as much as possible the length of the present paper, I have not mentioned study-teaching in the manual and intellectual departments, I cannot refrain from alluding to it in this most important section of the educational field. The dental student should acquire the instinct of study. The dentist should have formed a taste, not for reveling and novel reading, but for work. He should instinctively seek self-improvement, both manual and intellectual. His study should not cease at his graduation; he should have learned one thing during his preliminary training and his college course, and, if he has learned little else, this one thing will suffice him; he should have learned it manually, he should have learned it intellectually, and he should have learned it emotionally; he should have *learned to learn*.

Of the social instincts referred to, the first is a pride in and a love of the *alma mater*. This, widening when the student enters the profession, will become the professional spirit,—the pride of the profession and the love of the profession. On the need of this professional spirit I shall not here dilate; I have spoken, in my opening apology, of its necessity—to the profession in the first place, and through the profession to the community and to mankind at large. The point here is that this necessary spirit is to be cultivated in dental education.

The other social instinct is fidelity,—sterling honesty in serving the laity or persons of necessarily inferior knowledge who intrust themselves to the dentist's care. The relation of dentist and patient



is one wherein superior wisdom is exercised for the benefit of a confiding protégé. The dentist is, less frequently indeed than the general practitioner, but sometimes, required to infringe the arbitrary ethical rules whereby the laity are bound. He is sometimes required to deceive the patient for the patient's good. The professional man's license to avail himself of the adage that "the truth should not be spoken at all times" is a license not to be idly granted to every one. It is liable to abuse, and is abused constantly—by men who, of course, ought to be excluded from practice. There is, or was, a practitioner in San Francisco who was said never to allow the filling of another practitioner to remain in a tooth which came under his hands; another was figuratively said to look into the patient's pocket instead of into his mouth, making the needs of the teeth correspond with the size of the purse; and similar abuses of professional confidence are no doubt to be found in other cities. It is plain, therefore, that the dentist, being in a position where deception for his own benefit is easy, and being frequently required to employ the placebo and other deceptive devices for the patient's good, must be armed so strong in honesty as to be proof against temptation. This instinct is a natural result of the other social instinct named, but is, as a branch, susceptible of special development, and should be developed by dental education.

So much for the general means of dentist-making,—the parts of our subject, and the relations of these parts. The first matter is the choosing of timber. This is not a part of education, but is a necessary preliminary. Passing to education proper, we find that the subject has three sections, which, mentioned in the order in which they come into prominence, are: manual education, intellectual education, emotional education. Manual education it has not been deemed necessary to analyze. Intellectual knowledge has three sections, which we have called the "what," the "how," the "why;" intellectual instruction has two departments,—inculcation and exercise. Emotional education has not been thoroughly dissected; we have merely divided the instincts into personal and social, and have noted the items most needful for our purpose,—the development of the love of study, the professional spirit, and the unselfish regard for those whose welfare is intrusted to the dentist's care. Such is, as far as we have gone, the anatomy of dental education,—the *what*. Turn now to the physiology of the subject,—the *how*.

There is manual skill to be given. There is intellectual matter to be instilled and intellectual power to be developed. There is the professional sentiment to be awakened and given dominant influence over the life. How shall these things be accomplished?

First, with regard to manual instruction. Dental art, like all other art, is to be taught by showing how, and inducing imitation. In later stages, description may suffice for the teaching of an operation or a method. But always the best, and at first the only, means of art-education, is that demonstrative showing which we call "the clinic,"—followed, of course, by imitative practice.

Next, with regard to intellectual education. Capacity for judgment, in dental matters, is to be obtained by practice in determining similarities and sequences. There must be sense-practice; the student must learn to take cognizance of his sensations—to see with his eyes, and, in dark places, to see with his finger-tips, and, instrument in hand, to see with the muscles of his arm. There must be practice in determining similarities ("diagnosis"); to which end there must be a body of intellectual information—a system of types or "extreme cases" with which actual cases may be compared. There must be practice in determining sequences ("prognosis")—not only sequences of disease, diathesis, cachexia, but also sequences of operations and other forms of treatment; to this end a further body of intellectual information is needed. In general, the process of intellectual education consists of induction of intellectual work; but the basis and the result of that work is a body of intellectual knowledge.

The method of teaching should be that which will give to the student as much information as his innate capacity enables him to organize, and no more; together with ability to actively use his information. We do not want to produce an intellectual starveling; and, on the other hand, we do not want to produce an intellectual prize-calf,—a mine of useless intellectual fat. In order to determine the method of procedure here, let us note more closely the first part of what is desired,—“as much information as he can organize.” There is, then, intellectually, as there is physically, a tendency to organization. And there is wanted, not an unorganized mass (learning), but an organized body (knowledge). Turning to the life-history of the physical organism, we may see how this mental organized body is to be produced. We commence with the mental amoeba, which absorbs and grows. Next, there comes a segregation and differentiation; a part of knowledge becomes a nucleus round which other knowledge aggregates. In due time the knowledge-body assumes an organized form; it becomes a system. The requisites for the production of this knowledge-system are, of course, food and exercise—mental food and mental exercise. But that which is to be here noted, as of special present concern, is the fact—the necessary fact—of centers of organization.

What these centers are, must be assumed as known. We must

take it for granted that, as the dentist is, as a dentist, familiar with the anatomy of the human body, so is he, as an educator, familiar with the anatomy of the human mind. More specifically, we must take it for granted that, as the dental practitioner has, before entering on the practice of dentistry, dissected the human teeth, so has the dental educator, before entering on the practice of education, dissected human knowledge. This is not the place for a dissection which must be presupposed. It must suffice here to state that knowledge has one supreme center, and that its sections are tributary to subordinate centers. The supreme center of all knowledge is—the desirable. Tributary to this are the two great sections of common knowledge,—the true and the useful. In other words, organized knowledge has for its center knowledge of desirabilities—philosophy; to this are tributary two other great sections: knowledge of natural truth, or science; and knowledge of ways and means, or art. We may compare the knowledge-organism to the vertebrate physical organism, with its fundamental framework (philosophy), its nutritive system (science), and its limbs or active members (art).

The knowledge-organism, then, is an organism. It is, in its developed form, a system—a great system, composed, like the physical organism, of minor systems. It is divisible primarily into three great systems or parts—the basal, the nutritive, the active—philosophy, science, art. What, then, concerning the method of intellectual education? That the requisites are food and exercise, we have seen. What of the mode of their administration?

Plainly, there must be taken, as the basis of instruction, the desirable. There must be an interest—either inherent in the subject, or connected with an end to be gained through knowledge of the subject. When interest is awakened, science-teaching and art-teaching should be carried on in such manifest connection with one another and with the desirable that the whole may be organized or systematized by the student. The meaning here will be best shown by contrast. In the normal modern curriculum, the student is told many things, true in themselves, but unconnected, incoherent, like the ravings of a maniac. This medley of learning he is expected to remember and to repeat in his examination. If, in teaching, there is sometimes an external semblance of system, as in telling the student the progressive formulæ of the alcohols or the paraffins, the fundamental or vital factor is omitted—for, except as a matter of barren memory for the passing of his examination, what does the student care for the formulæ of the alcohol-series or the paraffin-series? Without going further in this matter, I may simply repeat, as now rendered clear by contrast, the statement that information is



to be presented by the teacher in suitable connection for organization by the student.

Interest may be awakened in divers ways. The primitive man being unable to postpone the present to the future, the primitive means of producing interest is the exciting of direct curiosity. This may be done sensibly, by displaying novel phenomena; or it may be done verbally, by asking questions (the "Who made you?" of the catechism awakens intellect; it initiates "inquiry"). The developed man living in the future rather than in the present, the higher method of producing interest consists in the awakening of hope. There may be presented a prospect of gratification of curiosity, a prospect of doing good in the world, or a prospect of bread and butter. When, by proper means, interest has been aroused, information may be communicated, either experimentally or verbally, and the verbal instruction may be oral or written. Some detail on these matters will appear in the sequel. Here, we have to note that the student must himself digest, assimilate, and organize; knowledge cannot be communicated, it must be developed; any method or requirement which proposes to give to the student ready-made knowledge, instead of leading him to develop knowledge, is by its very proposal self-condemned.

It has been stated that, for intellectual development, work is required—work bearing the same relation to food in the intellectual as in the physical organism. Something concerning methods of inducing intellectual work has been implied in what has preceded; space forbids further consideration. It may be permissible to note here, as bearing on matters to be considered in the sequel, and as having been omitted in its proper place, the fact that the primary intellectual object to be sought by work is the development of attention.

With regard to emotional education, we have by implication seen something in considering intellectual education. It remains to glance at the matter of central importance,—the development of the professional spirit. This is a compound phenomenon, which, however, we must not here stop to analyze. It is sufficient to say that it is the same in kind with the Christian's devotion to his cause or the patriot's devotion to his country. It has, as its center, like its sister forms of devotion, good will—"good will toward men." It is strengthened, like them, by habit,—familiarity with place and custom,—the "home" feeling, and by knowledge of past triumphs in the good work to which the profession is devoted; and it is rendered vital by practical alliance—by work. These facts plainly indicate the means of its development, and when one more is added the outline will be fairly complete. That one fact is the intensifi-

cation of feeling by mutuality. As a mass of coals will glow with fervent heat, while a single coal grows cold, so is it with men. There should be encouraged the fraternity which now exists; and, moreover, admiration of leaders and benefactors should be encouraged, for these men are nuclei of union and makers of that history of the profession of which succeeding generations will be proud.

Briefly, the methods employed must be, in general terms: For manual education, the demonstrative showing and the requisition of imitative practice; for intellectual instruction, the presentation of information and the requisition of work; for emotional education, the awakening of enthusiasm by the encouragement of fraternity, emulation, and admiration. Here, as before, we have not subdivided manual education, and we have merely glanced at salient points of emotional education; but we have noted, with regard to intellectual education, that information should be, not fragmentary, but relevant or relative, connected on the one hand with desire, or on the other hand with work. We have also seen, in general terms, that methods should vary according to capacities of students. In the present summary may be included a matter which was actually mentioned in the previous section; namely, the evil of excess of learning. The method or system of education should be such as to avoid "cramming."

(To be continued.)

## THE FACE.

BY A. H. THOMPSON, D.D.S., TOPEKA, KANSAS.

THE human face is said to be the mirror of the mind, because it reflects not only the static intelligence and refinement of the mind, but also betrays its transient emotions and passing impulses. It is a matter of common observation that education, refined associations, and intellectual occupations, by elevating the mind, refine and spiritualize the face, in token of the refinement of the soul behind it. Thus the faces of persons with truly great minds—authors, artists, orators, statesmen, etc.—betray their greatness and are an attractive study to persons of sympathetic intelligence. The faces, for instance, of Cardinal Newman, Savanarola, Gladstone, Lincoln, are beautiful even in their homeliness, because of the great souls which have stamped them with the seal of superiority. In ordinary life we recognize a "good face" as betokening a good heart, and are instinctively drawn towards it. When such a one possesses a high intelligence also, we look for a perfect man,—one to trust and obey, for of such are they that lead men and move the world.

Of course there are exceptions to this rule. Refined faces are some-

times found among people of low intelligence and brutal tastes; but these are erratic and only indicate minds which by proper development amid favorable environments might have grown to something superior. They merely mean native superiority, latent and undeveloped. Or again, persons of education and refined associations sometimes have brutal faces; but these are only examples of misplaced education, the natural instincts not being of the high order that give the best results by training. But these are only exceptions to the general rule that a refined and spiritual face indicates either inherited or cultivated superiority, or both together.

It has been observed that faces grow in refinement as the mind develops. This is especially noticeable in schools and colleges, when the coarse, animal features of the child unfold and bloom into refinement and beauty as the education progresses. The face refines as the mind develops. And the person devoted to an intellectual or spiritual life reflects that life in his face, which grows more and more refined and beautiful as he pursues his elevating occupation and develops therein. The best examples of this development are found, of course, in those in whom the natural bent of the mind is favorable to such influences. Where it is unfavorable, the best of influences make but little impression.

Heredity has much to do, of course, with facial beauty and refinement. Generations of cultured associations and education will naturally produce faces of innate refinement and spirituality. If the course of such a life in a family is uninterrupted, it will lead more and more to beauty and refinement of features. But it is, unfortunately, rarely uninterrupted. There is degeneration in nearly every generation, either through crossing with coarser stock, or lack of education or moral influences or cultured associations, or the demoralizing effects of dissipation or low pursuits. So it comes about that coarse and refined faces occur side by side in the best of families, and often also in the worst. A refined face may appear in a coarse family or a coarse face in a cultured family, through the workings of the law of atavism. That law will account for a low and brutal mind, a "black sheep," in the best of families, or of a refined individual in an uneducated and coarse family,—the reappearance of former conditions. Such reappearances are due entirely to hereditary causes, and are in no case sporadic or accidental. Nature always works by law.

When we reflect that it is but a very few generations since our ancestors were savages, and that the length of that savage life was incalculably long as compared with the brief span covered by the civilized and historical era,—during which countless impressions, physical and mental, were stored up and made permanent and trans-



missible,—it is small wonder that low and animal instincts and tastes are so paramount in our lives. It is these impulses, coming from that long and dreary savage life, that we have to combat continually as we strive after a higher life. It was during that period that the mind of man was evolved and differentiated from the mental organism of the mere brute. With the evolution of the mind the face was developed and humanized, and as it receded from the animal face it approached a higher form, because it was the index of a soul. The face of the lowest savage man is little above that of animals in expression (except of superior mental power), because the higher mental qualities and emotions are yet dormant. As he emerges from savagery into barbarism he begins to feel somewhat for others, acknowledges that others have some rights, and from this stage the emotions are developed and his subsequent refinement and elevation are assured. The mind attained its full natural growth in savagery, and what it has advanced since then is merely by means of the artificial culture which has been superadded. So it is that the face has undergone but little change in historic ages, except in refinement by reason of the cultivation of the mind. If the child of any of the civilized races of man be reared in savagery without education, he would be but a savage yet.

With the birth of the emotions a great step forward was taken in the development of the face, for the emotions have much to do with facial beauty. A high intellectuality alone will not make a refined and beautiful face. Such a mind must be wedded to a warm heart to sanctify its mere strength. The noble impulses of great minds come from good hearts that prompt them to say and do great things for mankind. Lincoln's great deeds and sayings were due to his goodness of heart more than to strength of mind. Napoleon was great in generalship, and by the brutal strength of his mind he plowed his way through men and left death and misery in his path. Being heartless and selfish, the world despises him as a man and scarcely cares to admire his genius. With the greatest men of the world, as well as in ordinary life, it is the man who is kindest and best that has the most influence with his fellows. The growth of the good and elevating emotions has a refining effect upon the face and measurably atones for the absence of education or mental strength, which sometimes weakens a face. Good emotions are, in fact, the main factors of spiritual beauty; but as the animal selfishness which we have inherited from our savage ancestors is yet the mainspring of most of our actions, it is little wonder that there are few faces that are beautified by this reflected unselfishness.

The struggle for existence in our selfish commercial life is quite as fierce as in the days of the mere physical struggles of our ancestors:

the fittest in physical prowess survived then, and the fittest in commercial shrewdness survive now. There is the difference, however, that the unfit are cared for to some extent by the more fortunate in our day, especially when intellectually or spiritually superior. But the financial conflict and the grinding care this conflict brings upon all classes, weighs down the minds of men and furrows the face with lines. The daily anxiety about the means of living does more to destroy facial beauty than grief or suffering. It springs from and fosters selfishness and misanthropy, and crowds out higher thoughts and better emotions. It is this care and anxiety that destroys all traces of beauty, either natural or acquired, in ordinary faces. Surely civilization has done little for the struggling masses;—better the communism of barbarism than this soul-destroying conflict and anxiety!

And yet there are some beautiful and spiritual faces to-day,—the reflection of lofty minds and souls on which the sordid cares and anxieties and selfishness of life seem to have had little effect. They are such as have been saved by circumstances from toil and anxiety and are thereby enabled to give their thoughts to lofty themes, or those who by temperament are oblivious to care and carry the burdens of life lightly, or of those who by strength of mind ignore the petty things of life and live in a world of their own; or, more rarely, a face is illuminated by a soul lit by divine fires, and tells of a spirit not of our poor, common humanity. But the faces worth looking at and analyzing occur as rare oases in the desert of mediocrity around us, and serve but to redeem the mass from total condemnation.

Although the majority of faces as we meet them are hopelessly mediocre and some even repulsive, such as they are it is our professional duty to study them, by reason of the relation of dental science to the outward face and the effect of our art upon it. Our work often has a perceptible effect upon the features, and some branches of it, especially orthodontia and prosthesis, often cause a revolution in the expression of the face. So we have powers to alter even the mediocrity which we daily meet, and the effect of our operations upon a fine and sensitive face is too often startling. So few faces have any visible soul in them that the attempt to produce any artistic effect is disappointing and disheartening. This is one unrecognized source of the low grade of artistic prosthesis that prevails,—*i.e.*, expressionless faces cannot be reanimated by any resource of our art, and by our failures we are discouraged, when the cause of our failure is really not lack of skill.

The anatomical relations of the face are very simple, and beauty, so far as dental resources and the influences of our art are concerned,

depends largely upon its mechanical elements. There is to be considered the proper proportion of the different sections and areas of the face, the exact proportion and harmony of the features, the proper amount, without excess, of upholstering and padding by adipose tissue, the texture and color of the skin, etc. From the mechanical stand-point the main elements of beauty are proportion, contour, and color, and from this basis the dentist must view the face, for his resources are purely mechanical. He might like to put more soul into a dull face by way of completing it, after he has done his artistic duty, but he cannot do it. If the gods have omitted that important factor in the composition of the individual, it is not for any finite dentist to remedy the omission. The artist or sculptor may spiritualize a face, but the dentist, the bumble worker on the natural clay, cannot aspire to such divine work. Hence his heart is often saddened by disappointment when his best efforts have been expended in the futile endeavor to elevate a face nature has neglected.

From the stand-point of the mere artistic mechanics of the subject, when we study the faces we meet in practice, we observe that there are very few that are properly proportioned according to exact rules, that most faces are more or less asymmetrical, and that facial deformity is the rule. It is the exception to see a face in which the features are in harmony and proportion. This is probably largely due to the heterogeneous mixture of races and types. This racial intermixture prevails so extensively in this country that inharmony of feature is the rule, for very few American faces are well composed. This inharmony will continue until foreign influx ceases and prevalent types are developed. Inharmonious features crop out in many faces, and are out of harmony because of a very different type. Or, again, two or more types may be represented in a single face. A feature may be fine enough of itself, but if of a different type from the rest of the face it is out of harmony and becomes a deformity, whereas if it were set in the midst of harmonious features of its own type it would be beautiful. For instance, the nose is often out of harmony with the remainder of the face, being either too large or too small, or of such shape or expression as to be out of all relation to the prevailing type of the face, and that in that setting it is a deformity. The mouth, also, is often inharmonious. A thick-lipped, sensual mouth set in the midst of a refined, spiritual face strikes all observers as being a ludicrous combination. A weak and receding chin accompanying a strong upper face is painfully incongruous; but in the male sex such a deformity can be concealed by the beard, which often gives a face a dignity it would not otherwise have. Nearly all faces have one, two, or more features of different



types from the prevailing type of the face. Harmony of type in all the features is a rare good fortune in a heterogeneous people.

Much depends upon contour for beauty of the face. Youth is the season of freshness of beauty, as the face is then full and well rounded. This beauty of contour is produced by adipose tissue, and as age progresses this disappears, the features shrink and lose their expression, the muscles become less mobile, the skin loses its youthful color and texture, and as the years toll off the face assumes more and more the shape of the bony framework beneath, betraying approaching dissolution. Then again, the experience of the years leaves its marks. The face in age may be serene and placid, or plowed with the furrows of suffering, as the life may have been happy or otherwise. Disease may also cause the face to shrink prematurely and reduce the contour by emaciation. This, however, is usually corrected on the restoration of health by the redeposit of fat, except in the case of chronic disease and insufficient nourishment of the tissues. Contour is a principal element of beauty, in a mechanical and artistic sense, and, other things being equal, the plump face is the most agreeable and attractive. A certain amount of fullness, or tissue body, is necessary for the proper support of expression, for shriveled features cannot be expressive and active in conveying the workings of the mind. Therefore, in the restoration of expression, within the limits of his art, which is altogether mechanical in its effect, the dentist has in view the plumping of the shrunken face with the object of restoring the features to their proper contour.

There are many abnormal causes of facial deformity, and among these dental irregularity stands prominent. On account of insufficient room or other causes, the incisors may be crowded and forced forward, thrusting out the lips and producing an abnormal expression of the mouth. Or a V-shaped jaw may mar the strength of a face and give it an imbecile cast. Or the cuspids, by erupting forward of the dental line, may give a ferocious expression to a mild face. Premature extraction of teeth may lead to contraction of the jaw and asymmetrical development of the face. The removal of the cuspids causes a depression in the line of the canine eminence and a sinking of the face quite up to the alæ of the nose, with a consequent destruction of symmetry. Many other forms of dental irregularity affect the features and mar the beauty and symmetry of the face in greater or less degree.

Disease often has a directly deforming effect also. Thus, hypertrophy of the tonsils is sometimes accompanied by mouth-breathing and compression of the alæ of the nose and narrowing of the bicuspid region of the face, thus producing an abnormal conformation. Nasal catarrh sometimes causes distention of the

nose, with disagreeable disturbance of the harmony of the face. Affections of the breathing apparatus causing distress and effort in breathing lead to distressed expression and straining of the features, and may produce permanent contortions from spasms. Chronic diseases of other organs, especially of the heart or stomach, often give rise to peculiar expressions of distress or anxiety which may be pathognomonic. Nervous diseases, paralysis, etc., of course, often have a direct effect in producing contortions of the features, and physical pain from any source is always indicated by the faithful reflector. But yet again we sometimes see persons in whom prolonged suffering and an invalid life lead to such serenity of mind by the contemplation of lofty themes and the cultivation of religious devotion and resignation, as to ennoble and spiritualize the face and give it a mysterious and wonderful beauty. There are exceptions, of course, to the average, for as a rule the cruel hand of pain scars the face with the too evident signs of its presence. Suffering, indeed, usually alters the whole character of the individual and makes him better or worse. It lowers or elevates the soul, and the face reflects the changes.

But let us turn from these disagreeable considerations to the contemplation of the beauties of the face for their own sake. Beauty everywhere is for enjoyment. Nature created beauty to excite pleasurable emotions. It never ministers to misery or pain. So, indeed, a beautiful face is created to be admired and enjoyed. The first thing that strikes us favorably in a face, is exactness of proportion, and then harmony of the features, whatever the type. These give pleasure to our artistic sense, be it crude or cultivated, for the artistic sense is innate in all men. We enjoy a beautiful face, be it young or old, man or woman, as other beauties in nature or art, with an additional pleasure from the consciousness of it being living beauty and that it is animated by a soul behind it whose beauty it reflects. So in the beautiful face of a child it is the innocence and joy and freedom from care that the face reflects that attracts us, while we admire the mere form and contour and color. So also with the face made beautiful by intelligence and spirituality; we enjoy the contemplation of it for what it represents, and it lifts us above our sordid selves. The ethical effect of this spiritualized beauty in man or woman has a powerful influence for good, and it is felt by all men more or less consciously. A good face does good by its mere presence among men, and the influence of such a person cannot be estimated. But facial beauty is so varied and standards vary so much that, taking all classes and tastes, perhaps there may, after all, be very few healthy faces that are not attractive and more or less beautiful in some eyes,—dull and commonplace as the majority of them appear.

But still another source of enjoyment of beauty of the face is given us in sculpture and painting. There it is usually idealized so that we have, in a certain sense, a higher expression than in the living face. In antique sculpture the faces are idealized to represent the high conceptions of gods and heroes, and there is a dignity and grandeur in them not approached by any human faces. In the religious portraits of the old masters we have other ideals which are more than human. The faces of the saints are animated by devotional ecstasy, and vividly represent the mastery of pious thoughts and ideas. In later art there is the idealization of various great conceptions in the sculptured or painted face. All art, in fact, illustrates the expressional possibilities of the human face as a vehicle for the portraying of high motives and lofty themes, that move men and lift them from their grinding lives to spheres of spiritual and ideal life. Beauty everywhere, and artistic expression of its highest forms, seems to feed if not satisfy an indescribable, artistic longing, and brings us nearer to those dreams which sometimes flash upon us like memories of the beautiful seen in other worlds!

### SOME METHODS OF REGULATING TEETH.

BY V. H. JACKSON, M.D., D.D.S., NEW YORK.

(Read before the American Dental Association, at Saratoga, August 8, 1889.)

It is not my purpose to present an exhaustive paper, or make claims of superiority for methods or appliances, but I wish to describe a few additional practical methods in the construction of regulating appliances which have been used in practice a sufficient length of time to prove their value.

In studying models of the jaws where the teeth are much crowded, to determine whether the arch should be expanded or extraction resorted to, and in some cases before deciding on any method of moving the teeth, it is well to prepare an extra model from an impression, and after carving the teeth cut those to be moved from the model with a knife or a small disk saw attached to the dental engine, and again attach them to the model in the position it is desired that they shall assume when regulated. The dividers may be used to advantage in spacing the arch.

In the practice of the writer the spring is used in fixed as well as in removable appliances, the latter being preferred when practicable. Where one or more springs are to be used, their shape and position on the model can be best determined by bending soft copper wires and attaching them in position with wax, especially if several are to be used, as their action and relationship can thus be seen at a glance.



The writer has for some time used very satisfactorily a method of uniting two or more pieces of piano-wire to form appliances to be used independently for regulating, and for uniting piano-wire to gold, copper, silver, and other metals.

In uniting piano-wire it can be left round, or flattened by the use of the hammer, file, or corundum-stone, and the parts to be united made bright with emery-cloth, and held together temporarily by cord at one or more places. The parts joining are then bound tightly from end to end with a fine binding-wire of copper, iron, or platinum (see Fig. 1). The part

FIG. 1.



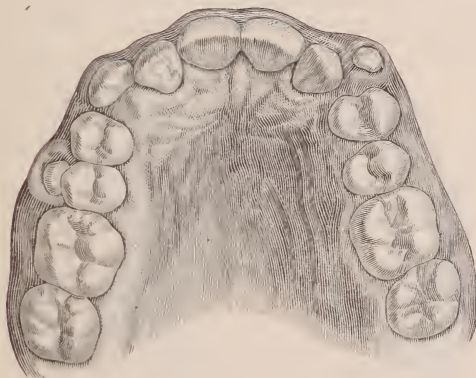
bound is then soldered with soft solder by warming it with a spirit-lamp, and laying on pieces of solder, the surface having been covered with muriate of zinc. It is found, however, that tin is preferable, as it remains bright in the mouth, and can be used in the place of solder, except where gold or silver are used. Or the appliance may be immersed in the molten metal, tinning the whole apparatus at the same time. The temper of the steel is not materially changed by the process of tinning. Iron binding-wire has been used in the mouth for months, but is very liable to corrode, even though well tinned. The smaller-sized copper wire has been used more satisfactorily, as it is more easily worked, and does not corrode. Tin or solder unites with it freely. A very nice finish to the joint can be made by rolling a small-sized copper wire very thin and using it in the same manner.

We will now consider a method of bringing the cuspid teeth in line where they are too prominent or entirely outside of the normal line of the arch, the lateral incisor on one or both sides being nearly in contact with the first bicuspid, whether the cuspid be fully erupted or just pointing through the gum (Fig. 2). In the latter case it will be admitted that it is the proper time to move the cuspid into line, if an appliance can be so constructed and adapted as to move it to place without causing more inflammation, and more inconvenience to the patient than it would if more fully erupted. In either case, however, it can be easily accomplished by the following briefly-described device.

Across the model of the arch to be corrected place a piece of piano-wire, about No. 20 gauge, between the lateral and first bicuspid, on either side if both cuspids are to be moved, and bend to follow the curve of the roof of the mouth between those points. If there is insufficient room for the wire to pass between the teeth, they should be separated by wedging until one wire can pass freely. The ends of the wire are then curved forward and bent back on it, forming a loop on either end of sufficient size and depth to surround

the cuspid and pass again between the lateral and bicuspid, with the ends cut off about one-eighth of an inch from the lateral. The looped end of the wire when spread forms a spring which will separate the lateral from the bicuspid, making a space for the cuspid. The end of the loop is now bent upward, which makes an additional

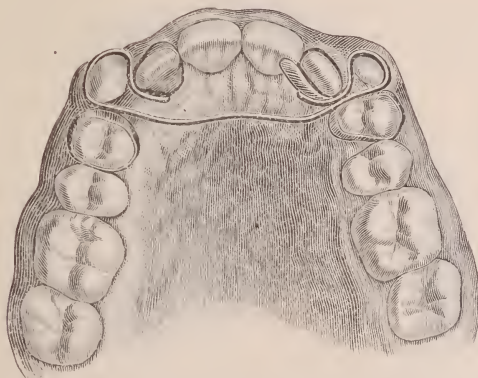
FIG. 2.



spring that bears on the cuspid and forces it into line as space is being made for it (Fig. 3).

If it is found, in studying the model, that any portion of the arch back of the cuspid should be spread, to assist in correcting the irregularity or to improve the articulation of the teeth, another wire is adjusted to accompany the former one across the arch to the

FIG. 3.

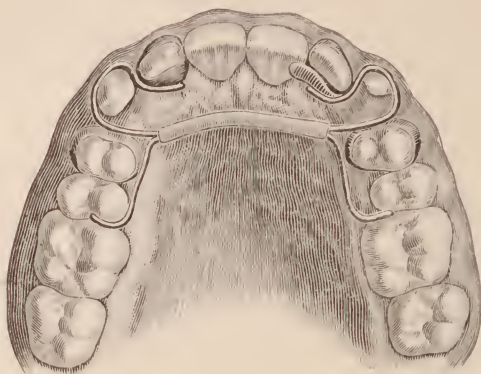


palatal surface of the bicuspids, and bent backward following the line of the gum beyond the teeth to be moved and the end curved up on to the grinding-surface at any place that will not interfere with the articulation, to keep the wire from pressing on the gum when in use. It will readily be seen that this portion of the appli-

ance forms a spring, and when spread will force the teeth outward, enlarging the arch as desired (Fig. 4).

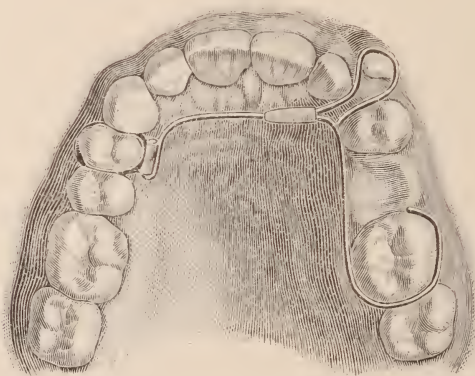
If it is found more practical to remove either of the bicuspid to give space for the cuspid (see Fig. 3), the portion of the appliance last described may extend beyond one or more molars and terminate

FIG. 4



in a clasp around a tooth that will assist in drawing the bicuspid backward. The two wires mentioned are then bound together with the binding-wire and tinned as described (Fig. 5). The appliance is best retained by placing a gold band with a groove on its surface on one or more teeth on either side of the arch. The lateral incisors are

FIG. 5.



usually chosen, for reasons described later. It will be found, however, that retaining-bands will not be required in all cases.

After the smooth bands are fitted to the teeth, the appliance is placed in position, and the bands marked below its line of contact. The bands are then removed, and the smaller size platinum wire is



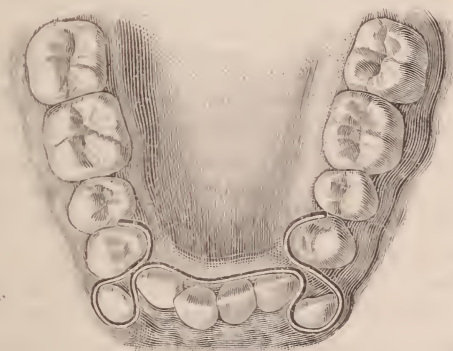
fitted to the marked portion and soldered to form the groove. The band is then fastened to the tooth with oxyphosphate cement. If the appliance is not well retained, bands may be placed on the bicuspid or other teeth as needed.

If the lateral incisors are to be moved a considerable distance or require turning forward, a lug may be soldered to the palatal surface of the band, and project back of the central incisor (see Figs. 3 and 4).

If all the incisors are to be carried forward, a thin bar may unite the lateral incisors back of the centrals and thus hold all the incisors in the same relationship.

Similar appliances to those above described may be used for making room and forcing prominent lower cuspids into line. In such a case the wire should follow the curve of the arch back of the lower in-

FIG. 6.



cisors, passing between the laterals and first bicuspid, forming a loop by curving backward (Fig. 6), and preferably be retained by bands.

If posterior teeth are to be moved, additions may be made to the appliance as previously described.

It is found in practice that wires interfere less with the voice articulation when they cross the roof of the mouth by the first bicuspid, following the curve of the arch, than when they are arranged to pass near the palatal surface of the incisors.

Innumerable changes can be made in the arrangements of the springs for the purposes mentioned. A few of the important ones only will be stated here.

If the arch is not to be spread laterally, or the position of the bicuspid changed, the first wire crossing the arch can be used alone in many cases by employing bands on the lateral incisors and the first bicuspid; or two wires may cross the arch, with the ends of one curved so as to encircle the cuspid, and the wires separated to act as a spring to gain the space required.

If but one cuspid is out of the arch, a gold band is placed on the

opposite one, or on a bicuspid, with either an eye or a tube soldered on the palatal side, into which the wire, bent at right angles, can hook, and thus be held firm, and the other end is formed and held as before (see Fig. 5). The appliance can be removed when more pressure is needed, and changed at any point with the clasp-benders.

The richer spring metals will not be found to be so effective, but if used with the above method a flat piece of gold, or gold and iridium, should cross the roof of the mouth in place of the wires described, with the spring wire soldered to it to form the springs mentioned.

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## PROCEEDINGS OF DENTAL SOCIETIES.

### AMERICAN DENTAL ASSOCIATION.

(Concluded from page 793.)

#### SECOND DAY—*Afternoon Session* (Continued).

SECTION I, Prosthetic Dentistry, Chemistry, and Metallurgy, was called, and a note was read from the secretary, Dr. Wm. B. Ames, of Chicago, stating that, owing to the absence of the chairman, Dr. J. Rollo Knapp, of New Orleans, who was prevented from attending by a death in his family, the Section would be obliged to ask a little more time to prepare a report.

Section II, Dental Education, Literature, and Nomenclature, was called, and Dr. W. H. Atkinson, New York, chairman, stated that there would be a report by the secretary, and papers by Dr. Chas. B. Atkinson, New York, and Dr. Louis Jack, Philadelphia.

Dr. Louis Ottofy, Chicago, secretary of the Section, read the report, which stated that the present number of dental colleges in the United States is thirty-one, the Dental College of University of Denver and the German-American Dental College of Chicago having been established during the current year. Seven hundred and ninety-six persons were graduated, an increase of fifty over the previous year, bringing the total number of graduates during the last four years (1886-1889) up to twenty-six hundred and forty-two. Post-graduate courses have been established in a number of the colleges, which may be expected to accomplish much good in the educating of those who were deprived of a proper preliminary or professional education.

The most vital questions relating to dental education are those of uniformity of courses of instruction, of extension of the sessions, and of requiring three full years' attendance. One of the colleges which formerly required three full years has arranged a graded two years' course. It is painful to chronicle a backward step, though

undoubtedly the institution was justified in its action. The Section heartily indorses the few colleges which maintain a three years' course of nine months. While some dental colleges may not be conducted strictly for the best interests of the profession, there are now no bogus colleges in the United States.

The publication in the dental journals of lists of books with carefully prepared reviews of the most important makes it unnecessary to continue that branch of the subject of Dental Literature.

There is nothing to report in regard to Dental Nomenclature.

Dr. John S. Marshall, Chicago, wished to explain why the school with which he is connected (University Dental College), which was the one referred to in the report, had dropped from a three years' to a two-years' course. They found that they could not compete with the two-years' schools; that students, when they found they could not get through in two years, would go away after the first course and take their second in other schools. The faculty had had the experience and had gone down deeply in their pockets to pay for it. The measure was only adopted for self-protection, and they would wipe it out as soon as possible.

Dr. W. H. Atkinson read a paper entitled "Some Thoughts on Education," by Dr. Chas. B. Atkinson, New York.

The inadequacy of college instruction to meet all the demands of practice is shown in the increasing number of post-graduate schools. Were the collegiate courses sufficient to prepare teachers,—as *doctor* signifies,—post-graduate courses would be unnecessary. When so great diversity of method and fact is taught, the courses might be greatly helped through frequent interchange of methods and discussions of principles by the associated college faculties. A more uniform curriculum would be encouraged, and students would reap the advantage of all opportunities, discoveries, and late methods. Instruction as now given is too often personal with the professor, and a strife to uphold a theory and gain adherents thereto too often maintained, rather than a clean effort to advance the quality of instruction, whatever the source of improvement. Corps of lecturers, if untrammelled by warnings against statements antagonistic to the teachings of the faculty, would introduce an element of diversity and novelty.

College instruction falls short in practicalizing what is taught, more especially in preventive dentistry, diagnosis of surgical aspects, and operative surgery. What is needed is *better* dentists, rather than *more* of them. Not dentistry alone, but all the professions are crowded with partially educated holders of degrees.

The ideal post-graduate school is a society holding frequent meetings and clinics. In a paper read by the chairman of Section



II at Boston in June last it was suggested that the colleges might be made State institutions, thus relieving the chairs of pressure to increase the fees by taking as many students as possible. Three needs are advanced: First, a dental college association to which all faculties belong, meeting at least twice a year with the purpose of harmonizing educational effort with the best old and new attainment. Second, extension of studentship to full three years' infirmary practice, rigidly supervised, with six months' lectures in each, and exhaustive yearly examinations covering the course. Special boards of examiners would be an improvement. Third, dental unions holding monthly or more frequent meetings, maintaining infirmaries where complete facilities for clinics would always be at hand, under the management of efficient men, should supply every need of a post-graduate school in a better way.

A journal published by these unions, covering their transactions, would be immensely valuable. The clinic reports, properly illustrated, could be made an especially useful feature, and thus would arise an "independent journal" whose pages would invite contributions outside of the unions. Very little consultation could amalgamate several societies into a district society or union, and these could combine into a federation, ready to grow to international importance. Then a dental congress could be held, with all the machinery in order to make it a success, whereas now it is of doubtful expediency.

In this connection, the query arises, Would not a new school of advanced capacity be competent to graduate an M.D.D.S.,—Doctor of Medicine and Dental Surgery,—and thus lay the ghost of "dentistry a specialty of medicine," by recognizing in the diploma what medical knowledge is expected of us?

Adjourned till 8 o'clock P.M.

#### *Evening Session.*

The association met at 8.30 P.M., President Butler in the chair.

The secretary read a paper by Dr. M. G. Jenison, Minneapolis, Minn., entitled "Oral Surgery, and Who should Perform it," of which an abstract follows:

He spoke of the advances from the medical and surgical standpoint which had been made by dentists in the past few years, and of the increased requirements of the educational institutions which promise still further advances.

There is a class of disorders of the oral cavity requiring systemic treatment and surgical interference, and demanding skill of a higher order than is possessed by the average physician or dentist, and which clearly calls for oral surgeons and specialists. In illustration

of this need, the essayist instanced several cases in which great suffering had been endured by patients for a long time, and in which severe surgical operations had been submitted to for relief, a false diagnosis having been made by their medical attendants. These were cases which any intelligent oral surgeon would have correctly diagnosed and relieved the patients by simple instead of formidable operations, besides saving them a vast amount of unnecessary suffering.

The subject was passed.

Dr. W. Xavier Sudduth, Philadelphia, gave a lantern exhibit and lecture on "The Skin as a Formative Organ," taking up the development of the teeth and dwelling especially upon the method of calcification, and showing how a perverted physiological action may give rise to a pathological condition in which a pathological product may result. The lecture was amply illustrated by over fifty photo-micrographs, a description of which would be of little interest without the pictures themselves. Referring to the development of dentine and enamel, the lecturer said that the main point of difference between his view and that of Dr. Heitzmann and those who believe with him is that they maintain that the process is a transformation, and he cannot see it. He has said time and again that they are secreted around the fibers, in much the same manner as bone, in which it is positively ascertained that there is no transformation, but a secretion. There is no question in his mind that dentine is produced by secretion, and he believes enamel is formed in the same way, though he is not so clear on this point. If the transformation theory were correct, we should have a process of repair in case of fracture, which we do not find. The space is not bridged over, except sometimes by a deposit of secondary dentine. The office of the dental pulp is to develop dentine. In a tooth with fully developed dentine the pulp has nothing further to do. He would not hesitate to devitalize a tooth for a person twenty years of age or over.

Adjourned till 9 o'clock to-morrow morning.

### THIRD DAY—*Morning Session.*

The association met at 9.45 A.M., President Butler in the chair.

Sections IV and VII were passed.

Section II, Dental Education, Literature, and Nomenclature, was again taken up, and Dr. Louis Jack, Philadelphia, read a paper on "The Necessity for Independent Dental Journalism," as follows:

I arise to address this association upon the use and importance to dentistry of independent journalism.

It is not my desire to occupy your attention by an enlarged con-

sideration of the subject, but I do so for the purpose of inducing discussion by others of these topics. It needs but little demonstration to establish the principle that the development of correct sentiments upon all questions of polity which are immanent and which may arise relating to dentistry can be best stimulated in a state of freedom of its literature from the bias of personal interests.

The public press is an indispensable department of the most important of all the liberal professions,—that of the teacher,—and it must be conceded that it has for a long period exercised an influence second to none in forming opinion and in shaping the course of events.

It occupies a peculiar and conspicuous position: for while it is prepared to dispense instruction in any direction toward which the human mind may turn; while it may be called upon for an answer to any question which may be formed in the field of human knowledge, and is expected to give an intelligent answer,—it wields the power of creating and of shaping public opinion by the presentation of facts and the statement of principles. It also fulfills the function of seeing for the people by using its Argus eyes to penetrate every action which concerns the public or human advancement. These functions could not be most usefully exercised if the public press were not independent, for so far as it is bound by the influence of party, prejudice, or pecuniary interests, so far must it fail properly to carry out the purpose for which it exists. It is plainly evident that the exponents of truth should be free from self-interest and be of good morals to see clearly any question for others involving the presentation of truth.

When the press is not free in the sense above expressed, the development of public opinion is hampered, and the minds of those under its influence are necessarily darkened. The contrast of the two conditions is shown in the comparison of the press of Russia and England, and it may be stated as axiomatic that any influence which checks full expression of thought is an enslaving one.

What the press performs for the public, dental journalism should do for dentistry, and those controlling the latter should have an eye single to the higher interests of dentistry. It is a fact with which you all are familiar, that dental journalism has for many years, with little exception, been under the management of persons engaged in commercial pursuits, and whatever their pretensions may have been, they have failed editorially to discuss the questions concerning us, as they have arisen, without the bias of their business interests. In the very nature of the sensitiveness of trade and the constitution of the human faculties it could not be otherwise. Independent opinion could not be stated, for the fear of its influence upon their business.



They may very excellently record the transactions of things done, but in the very nature of the case they cannot properly present the living issues of the time. They have not the desirable sympathy, because they are not of us. They have not the power to produce the pabulum out of which professional character is formed. For this reason they do not properly influence the minds of the student and the younger men, and therefore the most liberal views of our relations to each other are in a state of decay, and there is consequent deficiency of *esprit de corps*.

There is a further reason which disqualifies business men from conducting our literature for us. They have proven by their conduct and have declared by their words that the ethics of business and the ethics of professional life are different. This appears to be true as the world now goes. The essential spirit of professional ethics is such a consideration for the interests of others as to lead one to prefer the good of another to his own benefit. This is a heavenly spirit. The general tendency of trade is to secure the good of the individual to the disadvantage or the injury of others. This in comparison with the other course is an evil nature. They who are guided by this principle of action are morally unfit to lead the opinions of others, for the reason that as their actions spring from bad principles they fail to be in the light of truth.

These journals have usurped the function of supplying the dental profession with liberal and pertinent thoughts upon the current events related to dentistry as they have arisen. They have stifled in some cases the full expression upon questions which were by some construction of theirs not favorable to their interests, and have not hesitated to use those who have sold the birthright of honorable manhood to inculcate sentiments averse to high professional views and have tried thereby to create false ideas. They have used their influence and the power of their agents to check the efforts of dentists to organize for the purpose of defending themselves from the exactions of those who have under their encouragement grown into dangerous opponents to our professional interests. They have not had the disposition or the courage, even conceding they have possessed the clearness of intellect, to do any of those things which go to form the true grain of professional life.

It can scarcely fail to be recognized that dental journalism has for many years been in such condition as not to have called out the best thoughts of our leading men upon subjects concerning the growth of politic questions, and, being bound in these respects, it is a matter of serious concern whether in scientific directions there has been that freedom of growth which otherwise might have taken place.

In respect of the dental press there are many subjects requiring

to be dealt with in a manner which may promote the expression of the strongest and fullest sentiments of our members, and of developing enlarged and liberal views which are not likely to be fulfilled in a proper manner by any private journal. We have arrived at a stage when, for our protection as well as our advancement, I believe we should maintain an adequate and free medium of expression, and when, for our self-respect, we should ourselves have charge of our current literature. Whether we are a branch of the medical profession or whether we are a profession unto ourselves, the demand of the time is that we should be the custodians of our own journalism. In what estimation would the medical profession be held if it possessed so indifferent a spirit as to tolerate its journalism to be controlled by the purveyors of its drugs and instruments? Would it in that state be considered a profession? Would it not probably have remained in the condition it was in England a few generations since, when its standing was of the poorest? It would probably be overrun by the proprietors of secret processes, and in this age by a swarm of patents for formulas and instruments.

What would be thought to-day in the medical profession of the specialties of ophthalmology and gynæcology if the literature of these departments of medicine were managed by those who serve these specialties with their appliances? Let me say again, we should likewise be free if we would be self-respecting, and if we would have the enlarging confidence of the parent schools of medicine and the abiding esteem of the public.

Some of these expressions may appear pointed and seem unnecessarily severe. They are stated out of regard for our professional good, and in view of this the individual is as nothing. While what I here state may not now make much impression, nevertheless we will have need at length to awake to our necessities in respect to the state of our journalism if we would reach the full stature of professional manhood.

Dr. Barrett. A profession without a literature is an anomaly, and its literature will gauge the level of the profession. It cannot rise above the general intelligence, but it will be its exponent. The journalistic literature of dentistry is far in advance of what it was years ago. The profession and its literature have advanced together, but the profession has not done justice by its literature. He did not say this because the journal which he represented, when he had something to do with dental literature, was not sustained. It has been said that the *Independent Practitioner* was carried by its publishers at a constant expense to themselves. This is not so. The *Independent Practitioner* sustained itself and paid its bills liber-

ally. It had a good subscription list, and was sustained by some of the best writers in the profession.

The American Dental Association is supposed to represent the highest phase of the dental profession and dental intelligence, and yet it has discriminated against the independent journals. For a number of years past a dental supply house has published its proceedings, and the other journals have been shut off from the publication of papers. Is that the way to sustain journals? The speaker would have scorned to have accepted such a preference when he was conducting the *Independent Practitioner*; he would have wanted to see fair play. His tongue was tied then, and he could not say what he was now saying because it would have been claimed that he wanted to grind his personal axe. The house which publishes the Transactions does it well, and no reflection can be thrown upon it in any way. He argued against the principle that the American Dental Association should place itself under obligations to a supply house. Is that a dignified position for the American Dental Association? It is urged that it saves money. Is that what we are here for? If so, let us go home to our offices and see if we cannot make more there than here. It is unworthy of an association that occupies the position that this does to have its proceedings published in that way. They should be open for all the journals. Instead of this, when they have come for intelligence the doors have been slammed in their faces, and privileges have been refused them which were given to some one else. These facts have been burning in his heart for years. He has not read a paper before this association for years, because, although the editor of a dental journal, he could not publish his own paper in it or even make a full summary of it. When you clip the wings of your literature, what can you expect from it? It is a wonder that the literature is as good as it is, and it is so simply in spite of yourselves. He hoped this association would rise to the point of ability to pay its own bills. We are supposed to be here in the interests of a profession, to spread dental intelligence. He had sent reporters to society meetings, to have the doors shut in their faces. They were giving their proceedings to some particular journal, and would not allow him even to report.

Dr. Crouse did not hear the paper read, but he had heard a part of the last speech, and he knew something about the publishing of the Transactions of the American Dental Association. We were bankrupt for years. He remembered well starting around with a subscription-paper to raise money sufficient to pay past bills which the Publication Committee had been obliged to contract to get out the Transactions, and it did not seem to him a very dignified way of



doing our business. He presumed he had as much to do with the change in the manner of publishing as anyone, as he made the first arrangement to give the proceedings as an offset for the publication of the Transactions. What has been the state of the association's affairs since? The Transactions have been well published, and he did not think the association had been made to feel under any terrible obligation, only as he tried to make his patients feel under obligations to him for having done a thing right and well and honestly; and this high-flowing speech about the lack of dignity in this body for so doing is all nonsense. Any reporter can come here and make as full reports of these meetings as he sees fit. The Publication Committee make the best arrangement they can for the publication of the Transactions, and we have something in the treasury when it is needed. He failed to see anything undignified in that.

Section II offered the following resolution, which was adopted:

*Resolved*, That Section II be instructed to formulate and present at the next meeting of this association a plan of work for the sections of the association.

Dr. Ottofy had found, in corresponding with the various colleges, that interest in post-graduate study seemed to be on the increase, and it was likely to assume considerable importance, at the West, at least. A society of post-graduates has been formed, whose object is to combine with non-graduates who are unable to get into this body. He considers this one of the most important moves of the year in the matter of dental education.

Section II was passed.

Section III, Operative Dentistry, was called, and Dr. N. S. Hoff, the secretary of the Section, read the report, which called attention to the appearance of Professor Fillebrown's work on Operative Dentistry, written at the request of the National Association of Dental Faculties; to the new edition of Harris's "Principles and Practice;" to a general improvement by manufacturers in the quality of instruments and appliances; to the application of electricity in dental practice, modifying operative procedures and promising to be of great value. Allusion was made to the large share of consideration which has been given to the conservative treatment of the dental pulp, and to the subject of immediate root-filling. Of the latter practice there have been reported a number of cases of adverse results, suggesting caution, and the necessity for a more careful discrimination in the selection of cases for this operation. Mention was made of Dr. J. Head's suggestion of the use of cotton saturated with carbolyzed cosmoline as a satisfactory permanent root-filling.

Crown- and bridge-work continue to receive a great deal of atten-

tion, and much has been done during the year to perfect such operations. It has come to be of so much importance that special departments for teaching it have been organized in several of the dental colleges, and, occupying an intermediate ground between operative and mechanical dentistry, is being practiced by many as a specialty. The subject of porcelain has received considerable attention. Dr. A. H. Thompson, of Topeka, Kansas, proposes a gum-colored facing or inlay for restoring buccal cavities involving the roots of teeth. Dr. A. Robinson, of Grand Rapids, Mich., suggests a gold inlay, made by flowing pure gold into a platinum matrix that has been burnished to fit the cavity.

The fact is stated that a large number of copper amalgams have been introduced during the year, but the report gives no data as to the extent or results of its employment. A form of crystal gold known as "Nedden's" has been introduced into this country which has been used for many years in Germany and other parts of Europe, and is said to pack readily and easily with instruments peculiarly adapted for it, producing a hard and homogeneous filling preservative of tooth-structure.

A decided interest has been shown in the endeavor to obtain remedies and to discover methods of procedure for obtunding the sensitiveness of dentine, thus rendering large and tedious operations about the mouth less painful to the patient and less fatiguing to the operator. It is believed that the disposition to insert crowns in cases in which large fillings would otherwise be necessary results in large measure from the failure of plastic fillings to preserve the teeth satisfactorily. The hope is indulged that with better obtundents and improved accessories there may be a general return to the use of gold as the most reliable filling-material.

The secretary read a paper on filling roots by Dr. Joseph Head, of Philadelphia, in which the writer described his method of filling root-canals with cotton saturated with carbolated cosmoline, and detailed some experiments he had made in filling roots with oxychloride, gutta-percha, and the cotton and cosmoline. Specimens of teeth filled by the different methods named were also presented.

Dr. V. H. Jackson, New York, read a paper entitled "Some Methods of Regulating Teeth."\*

Dr. G. B. Watkins, Detroit, Mich., presented a case of regulating occurring in his practice, which he described by the aid of casts, as follows:

The patient is a young lady, twenty-three years of age. Three years ago he extracted for her the right superior temporary cuspid,

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\*See page 853, current issue of DENTAL COSMOS.

which was badly decayed, and found the point of the permanent tooth just showing. He then waited six months for the permanent tooth to come down to its place, when, as it had not moved, he made a plate with one tooth, which the patient wore for two years and a half. The permanent cuspid still remaining unchanged in position, he cut away the gum from its palatal surface, tapped the tooth, and inserted an anchor screw with an eyelet on the end. A Patrick regulating bow was then attached to the right first permanent molar and the left second bicuspid, and held away from the gum by means of T-bars placed on the bow between the incisors. A gold bar with a slide to fit the bow at one end and an eyelet-hole at the other was then constructed and placed on the bow opposite the position of the imbedded tooth. This bar was made long enough to permit it to protrude a little beyond the position of the point of the tooth when in place. The eyelet in the bar was then tied tight to that on the anchor screw with waxed floss silk. The ligature was renewed every second day. The tooth was brought into position in sixty days, and retained there forty days to allow it to become firm in its place, when the appliance was removed. That is now three months since, and the tooth remains without change of position.

Dr. Geo. L. Curtis, Syracuse, N. Y., read a translation of a paper by Dr. Wilhelm Herbst, of Bremen, Germany, entitled "Glass as a Filling-Material." Two kinds of glass are necessary: milk glass from a broken lamp globe (not from milk glass cylinders for gas, as these latter blacken in burning), and brown glass, the best of which is obtained from a cocaine or chloroform flask. These are separately pulverized in a porcelain or agate mortar, thoroughly washed in clean water, and after being dried put up in glasses. The cavity is prepared with a round drill, without undercut. Two or three impressions of the cavity are taken with wax or Stent's mass and models made. An artificial tooth is selected of exactly the color of the tooth to be filled, as a guide to the color of the filling. Eight parts of the milk glass are mixed with one part of the brown in a clean vessel and wet with water. The models are placed in another vessel of clean water, and after they are thoroughly saturated the cavities in them are filled by means of a brush three-fourths full of the glass mixture. The models and the glass are then dried with a linen cloth, laid on an iron plate and heated. They are then placed on a piece of soldering coal, and the glass melted with a single-flame Bunsen burner, being careful that the flame burns blue, without becoming white. The glass melts easily if the models are first well heated. After cooling, the color is compared with the test tooth. If the shade is not satisfactory, the glass is melted over, adding more of the brown or of the milk glass to obtain the desired color.



It is usually necessary to melt the glass two or three times. The filling should rather be too small than too large. The best of the prepared fillings is selected, and will be found to fit the cavity, which is then drilled a little deeper and undercuts made, and the glass piece fastened in with cement, being careful not to lay it on too thick. To roughen the surface of the glass where it comes in contact with the cement, a few grains of sand should be sprinkled in the bottom of the cavity in the plaster model, before putting in the glass mixture. The sand will unite with the glass in burning.

Adjourned to 3 o'clock P.M.

*Afternoon Session.*

The association met at 3.50 P.M., President Butler in the chair.

The consideration of Section III was resumed.

Dr. Harlan wanted to know whether in the experimental cases related Dr. Head prepared the roots for the gutta-percha and oxychloride fillings in the same manner he did that for the carbolated cosmoline and cotton. We would thus be enabled to find out something about the permeation of the dentine by the cosmoline.

Dr. J. R. C. Ward, Philadelphia, was present at the meeting of the Pennsylvania State Society when Dr. Head read his paper. He used the same care in the preparation of all three of the roots, but the discussion brought out the fact that he was more familiar with the use of the cosmoline than with the oxychloride or gutta-percha for root-filling. Another gentleman tried the carbolated cosmoline, and he has regretted it ever since. Its effects did not stop with the root, but it permeated the crown of the tooth, and he had to remove it and insert an artificial crown.

Dr. Hoff. In the experiments of Dr. Head, he enlarged the canal to the apical foramen before introducing the filling-material.

Dr. Harlan had listened to the reading of the paper, which tried to prove that carbolated cosmoline was the best material for filling roots, but said nothing about the merits of gutta-percha or oxychloride. The best method of using gutta-percha is as follows: After the root is ready for the filling, which presupposes that it is dry, introduce eucalyptol, which is diffusible, and in which gutta-percha is slightly soluble. In a few minutes the excess of eucalyptol is wiped out with fine-pointed cones, and then a solution of gutta-percha in chloroform is pumped in. This will permit the spreading of the material into all the apertures opening on the root-canal. The cones are not heated, but a pointed instrument which is heated is inserted in the large end of the cone, which is then inserted and the gutta-percha is spread and diffused all through the root. There

is nothing of this kind mentioned in the paper. If the gutta-percha were heated and forced in, the root would leak.

Dr. S. A. White, Savannah, Ga. How is the gutta-percha prevented from going through the foramen?

Dr. Harlan replied that if the foramen was so large as to permit that he didn't try to prevent it. Anyway, gutta-percha is the least harmful substance that could get through. It is absolutely innocuous and non-irritant.

Dr. H. J. McKellops, St. Louis, has practiced and advocated this method of root-filling a long while, as is well known, he having been one of the first to adopt it. The gentleman says in the paper that he drills out the canal. The speaker would like to see the man who can do that every time. He has seen beautiful teeth ruined by drilling, and he has specimens showing its effects which have been sent to him from all over the country. In using gutta-percha, the instant it reaches the foramen the patient starts and you know it is time to stop. He can come nearer to perfectly filling a root-canal with chlora-percha than with anything else he has ever known. He of course knows nothing of the new method described in the paper.

Dr. S. A. White had trouble frequently when he used the gutta-percha alone. Whether he pumped up air with it, he did not know, but he sometimes had after-trouble. To obviate this he had used long threads of cotton of the long staple kind, which is silky and strong. These he wraps on the smooth end of a broach, dips in the chlora-percha, and then passes up, and he has no trouble. He thinks dentists make as big mistakes in trying to clean out roots as in letting them alone. An excellent method of filling root-canals was shown him many years ago by Dr. F. Y. Clark. In this method, which the speaker uses to this day, the end of the root, at the apex, is filled with a small piece of hickory wood.

Dr. W. C. Barrett, Buffalo, used to introduce the gutta-percha on fibers of cotton, but he had abandoned that method, because the cotton is apt to become a sort of a piston which carries air up the canal, and with it the canal cannot with certainty be filled so perfectly as with the gutta-percha cones spoken of by Dr. Harlan. It is a mistake to suppose that the foramen follows the line of the canal up the root directly. He had been asked, "What about the apical space?" and in reply he would say that he does not believe there is any such thing; if there is, it is only occasional and must be due to pathological changes.

Dr. McKellops asked Dr. White how he would get the wood point up to the apex in a tooth with a very small, crooked canal.

Dr. White. There is no difficulty in reaching the apex of any of

the six front teeth, to which the method with hickory points is especially adapted. He does not think it necessary to fill openings so minute that the finest broach cannot be gotten through them.

Dr. Ward. Practice makes perfect. Dr. Harlan probably makes a success with chlora-percha, and so may Dr. White with the hickory points. Others claim success with cotton, and cases filled with cotton may be successful to-day; but those who get hold of them afterward don't think so. The speaker uses oxychloride of zinc. When the oxychloride has been forced up in the same way as gutta-percha, it will stay there. When gutta-percha goes through the foramen, you do have trouble. He has seen teeth extracted because of it. If oxychloride passes through, there is perhaps trouble for a day or two, and then it disappears. He has used the oxychloride successfully for ten years.

Dr. W. H. Morgan, Nashville, Tenn., has been practicing dentistry over forty years, and he enlarges the root-canal wherever he can. In teeth with straight roots this can be done, and it is desirable so as to permit the operator to see. He cannot always go clear to the apex, but wherever it is practical he does it to get rid of the débris. When the roots are large, he prefers still to fill them with gold, but he does not fill roots indiscriminately. He gives them a thorough antiseptic treatment first, sometimes continued for weeks where he cannot get through to the apex, as he must be sure the root is in proper condition before it is filled. Some fill immediately. This may do at times, but he prefers the other method. If the foramen is very large he fills it, sometimes using a little gold wire, sometimes by other methods, and then goes on with the filling of the root-canal proper. He does not know but that oxychloride of zinc is the best thing used for this purpose, because it absorbs a wonderful amount of gas. He has good success in root-filling, and can show cases of more than thirty years' standing. He would insist on the enlargement of the canal, and he can see no reason why, properly performed, it should be objected to. It would certainly facilitate the pumping up of soft materials. He believes that no root ever was filled perfectly with chlora-percha, because the material is put into the root in a fluid form, and when the chloroform is evaporated the filling must lose in volume. When he uses gutta-percha in filling canals, he simply softens it and then drives it up into the roots. It may cause a little pain, but gives no permanent trouble.

Dr. McKellops asked Dr. Morgan how he introduced chlora-percha into the canal.

Dr. Morgan replied that he had not been in the habit of using it, but he knew from general principles that anything which loses a portion of its substance either shrinks or becomes porous, and



therefore chlora-percha cannot be a perfect filling. As to Hill's stopping, it is not made at the present time. Dr. Hill said it was made of gutta-percha and quicklime. It was good for the purposes for which Dr. Hill used it. In reply to a question by Dr. White, he stated that he had tried to fill roots with hickory, but had never succeeded.

Dr. White protested against anyone condemning a thing of which he knew nothing. He had filled straight roots with hickory for eighteen or nineteen years. He does not fill the entire canal,—not more than one-eighth of an inch at the apex. The object in using it is to know that the foramen is closed; then you can fill the root with anything desired. The method is to file a piece of well-seasoned, dense hickory almost to a point; then pass it up to the apex. If there is the slightest indication of pain, withdraw the wood, cut off a short piece from the end, again insert, mark at the cutting-edge of the tooth; then again withdraw, and with a sharp knife make a groove around it about an eighth of an inch from the point, and bend the end over without breaking it off. Insert for the last time, the proper position being indicated by the groove, tap it home, and twist off the point.

Dr. Truman. A good deal of the talk on root-filling seems to be based on guesswork. Too many take the different preparations, place them in the root-canal, and expect it to remain comfortable for all time. The gentleman who wrote the paper sent him several teeth, the roots of which were filled with gutta-percha, oxychloride, and cosmoline. On cutting them into sections and examining under the microscope—they had been placed in aniline dye—every one was found to be non-leakable. The fillings were perfect, so far as the microscope would show. He had been led to conclude from this that every material used for root-filling, except raw cotton and wood, will answer the purpose. The question that has given him the most thought is that no filling in a tooth-root can be perfect, and why? Because the largest part of the tooth is a tubulated structure. These tubules hold organic material, and when the pulp dies this organic structure dies, and decomposition takes place at once, sulphuretted hydrogen being evolved to become a source of trouble. When the central canal simply is filled, this dead material is buried up, and in the course of time you have discoloration of the tooth. Any filling of the central canal only must be a partial failure. He had reached the conclusion that in filling a root account must be taken of the contents of the tubuli. The question then is, What agent will best prevent their decomposition? From experiments he had settled down upon the coagulators as best adapted for the purpose, because they change the character of the

organic material in the tooth. Chloride of zinc is one of the best of these, because of its affinity for moisture. It will follow moisture to the extremities of the tubules, change the character of their contents, and prevent their decomposition. A tooth treated with chloride of zinc will probably not discolor, and at all events there will be no trouble in the roots. He would not say that chloride of zinc permeates the tooth-structure, but he believes it does. The use of chloride of zinc requires care. If carried through the foramen, it causes inflammation. Hence, when he can, he fills the upper end of the canal, then places cotton saturated with chloride in the cavity for two or three days, and then he is prepared to fill it satisfactorily. He believes oxychloride of zinc is the best material to fill the remainder of the canal with, because it will keep up the effect he desires to secure.

Dr. McKellops. It is easy enough to open a root-canal a little, and few attempt to fill without enlarging the entrance to allow them to get into it easily. But he makes the point that no man can go to the end of the root with any certainty of following the canal. Chloro-percha does not shrink, nor does it become porous. The chloroform evaporates as the material is put in, which thereby becomes a stiff substance, and by the time the filling is completed all the shrinkage has taken place. It is now some thirty-two years since Dr. John S. Clark first brought to the attention of the dental profession the method of filling canals with gold foil made into cylinders, which he had learned from a gentleman named Badger. At the time of Dr. Clark's visit the speaker had a case of root-filling on hand in which Dr. Clark assisted him. The tooth was an abscessed incisor in the mouth of a young lady. After the abscess was cured, the root-canal was filled with cylinders of No. 4 gold foil rolled on a broach, and then compacted with whalebone such as is used to stiffen the lining of hats. He saw that tooth the other day, and there was not a bit of discoloration. It has never been touched from that day to this, and he is now working for the patient's grandchildren. He is a strong advocate of the oxyphosphate of zinc, which he considers one of the best plastics ever introduced into dentistry, but its place is not in roots. It may be used in cavities which extend far below the gum, and where the structure is too soft to permit the use of gold, and after one or two years the structure will have become hard and firm, so that a perfect gold filling can be introduced; but as far as its use in root-filling is concerned, he wants to know how it is to be got into delicate, fine canals. It will set before it can be got to the end of the root.

Dr. Morgan. Is it possible for gutta-percha or anything else to lose a portion of its substance by evaporation and not become less or porous?

Dr. McKellops. In filling roots with chlora-percha, the chloroform evaporates as the material is being worked and leaves the filling hard. Whatever shrinkage occurs through the evaporation is made up by the subsequent applications. It is worked nearly dry.

Dr. J. N. Crouse, Chicago, felt interested and amused by the discussion on root-filling. On the question of coagulation, for instance, Dr. Harlan insists that coagulators are not proper materials to use, while Dr. Truman uses oxychloride of zinc because it is a coagulator. The speaker thinks he can use either method with success. If there is any objection to the use of oxychloride of zinc, it is the danger of forcing it out through the foramen. In his own practice he uses gutta-percha and gold or oxychloride and gold, filling the apical end of the canal with gold. He wants the gold especially with the gutta-percha, in which he thinks there is a slight evaporation. But what he specially arose for was to call attention to the magnificent specimens of regulating presented by Dr. Jackson, the examination of which alone well repaid him for coming to Saratoga.

Dr. J. D. Patterson, Kansas City, thought the subject of root-filling the most important before the profession to-day. He desired to direct attention to an improved solution of gutta-percha for filling root-canals. The great majority of operators use the red base-plate gutta-percha, but a much better solution is made with the white gutta-percha filling-material, which has less shrinkage than the red. In crooked canals he uses this solution almost exclusively, sealing the apex, and filling the apical third or fourth of the canal. It is bad practice to force the filling-material beyond the apex. Oxychloride of zinc is the best filling for the remainder of the canal. He finds no trouble in forcing it to any part of the tooth, and he then feels that the organic material is placed in a better condition than by any other method. Roots filled with gutta-percha, when cut open, have more odor than those filled with oxychloride.

Dr. White wished it to go on the record that after preparing the wood point as he had previously described he dips it always in chlora-percha. When the apex is thoroughly closed, it makes no difference what the remainder of the root is filled with.

Dr. J. Taft, Cincinnati. The term "apical space," sometimes used, is misleading. "Apical region" or "apical territory" would probably be more distinctive and more readily understood. Some things which ought to be taken into account have not been considered in the discussion. We should not treat the teeth of a patient of twelve or sixteen years the same as one of forty, because the conditions are widely different. In early life the ends of the canals through the roots are more open than later. The tubuli are much larger and the tooth-structure of less density. A tooth at twelve is softer than



at thirty or forty, contains more organic material, and is therefore more exposed to decomposition. Our treatment should conform to these differences. Change in the organic contents of the tubuli should be prevented as far as possible by the use of antiseptics and coagulants, or by desiccation. Securing the proper condition of the dentine of the roots of pulpless teeth is of greater importance than the selection of the material for filling the canal. All dentists have seen teeth discolored by the decomposition of their organic material. As to the treatment of the canal at the end, it is well known that in almost all well-developed teeth there is an abrupt contraction near the end of the root. This is an important guide in the filling of canals. If there is any fear of going through, the foramen may be sealed up, for which purpose tin, gold, or lead may be used, and the remainder of the filling proceeded with. It is not a matter of much moment what the canals are filled with after this. Some indeed leave them open.

Dr. W. H. Dwinelle, New York. The lesson of the discussion is that nature is exceedingly accommodating. The experiences related are very diverse, almost contradictory of one another. He had never filled roots with wood except experimentally, but he is satisfied that if they are filled with wood alone the operation will be imperfect. The gentleman who related the method says he dips the wood point in a gutta-percha solution, which makes the filling virtually a gutta-percha filling. If the foramen is sealed, it makes little difference what material is used for the rest of the filling. He has used antiseptics to sterilize the contents of the tubuli, and he does not think he ever had difficulty when he paid particular attention to the treatment of the tubuli. He has seen teeth whose roots he filled nearly or quite fifty years ago (he has used gold for the purpose all his life), and they verify his theory and justify his operations. The foil is rolled in long cones on broaches, and the cones are packed in with elastic instruments.

Adjourned to 8 P.M.

#### *Evening Session.*

Dr. W. W. Allport, Chicago, in root-filling wants to know not only how he does it, but why. When the pulp dies, an abscess forms unless it is prevented by treatment. The office of the pulp is to form the dentine. When the pulp is removed, the principal source of nourishment of the tooth is taken away, and the tubuli are left filled with organic matter to decompose and generate gas. You may fill the canal as perfectly as you please, and these gases will percolate through the cementum and cause irritation of the pericementum. The first thing, therefore, after the pulp is removed,

is to get rid of as much of the contents of the tubuli as possible. For this purpose there is nothing better than heat. Dry the tooth with the hot-air syringe, and then pass up a root-drier, after which treat the root antiseptically. He is in the habit of filling always with oxychloride of zinc, because of the antiseptic character of the chloride. It will prevent further decomposition as far as anything he knows of. If the dentine is made perfectly antiseptic, a point which is too often overlooked, no further trouble need be apprehended. In cases where the pulp has been long dead and the tubuli are filled with dead and decomposing organic matter, he injects peroxide of hydrogen, drying the root thoroughly first. The peroxide will reach it readily and drive it out, the injections being repeated as long as there is any indication of decomposed matter. There are many things to fill with. Gutta-percha and gold are good, but they are inert. He fills the canal full of fluid oxychloride, arming a broach with cotton to force it up. With this any little fissures or apertures are readily reached, while it is hardly possible to force it through the foramen unless there is an abscess. Indeed, hardly anything can be forced through as a rule. More trouble comes from not clearing out the débris thoroughly and not filling perfectly than from any escharotic effects of materials forced through the foramen. In reply to a question by Dr. Taft, Dr. Allport said he did not know that there was any necessity, if the canal was thoroughly treated, for filling it perfectly, but it is safe to do so, and it may not be safe not to do it.

Dr. Dwinelle agrees with Dr. Allport that the office of the pulp is to form the tooth, and after the maturity of the tooth its function ceases, and it is not so important then that the pulp be alive. If the tubuli are thoroughly sterilized and the fibers coagulated, they become inert, and do not throw off gases. He thinks dentists pay too much attention to the preservation of the pulp after the patient has arrived at forty years of age or so. After say fifty years of age he does not consider the pulp essential.

Dr. W. Xavier Sudduth, Philadelphia. The securing of coagulation, which has been dwelt upon, is of no value whatever, for micro-organisms will come in spite of it. The whole story lies in securing an aseptic condition of the tissues.

Dr. Marshall. Will micro-organisms which live without oxygen produce decomposition, fermentation, or putrefaction?

Dr. Sudduth. Putrefaction may be the secondary stage of fermentation. So far as he knows, fermentation does not go on without the presence of moisture and oxygen. After the canal is perfectly sealed at the apex, micro-organisms cannot enter. In regard to the decomposition of the organic matter in the tubules, the micro-

organisms cannot enter them, because the diameter of the tubule is too small to admit them. Four things are essential to the development of micro-organisms, except those which are known as anærobic,—a living germ, a suitable medium, moisture, and the proper temperature. Destroy any one of those four conditions and the organisms are destroyed. Desiccation will prevent the development of the germs. The micro-organisms which cause decay when sugar is present produce lactic acid, which takes out the lime-salts of the tooth, and then the organisms live upon the basis-substance. They are never found in undecalcified dentine. Decalcification always precedes the entrance of the micro-organisms into the dentine. There is no difference between fermentation and putrefaction, but one may be a primary and the other a secondary stage of the fermentative process.

Dr. P. T. Smith. There is no doubt of the formation in the tubuli of gases which are injurious. They have sufficient expansive power to destroy the intertubular structure entirely. We cannot make tooth-structure in the mouth absolutely anhydrous. If it were dried perfectly, in twenty-four hours it would again be full of moisture received from the outside. The nerve carries the vital force, and it should be maintained where possible. He objects to the materials used for filling canals: to the chloride of zinc because it is irritating, and because it will disintegrate in time, and after it has disintegrated moisture will return to the tooth-substance. Gutta-percha is objectionable because it shrinks, and it will also decompose in time. He did not think that driving a wooden peg in was professional treatment. The dynamic influence of the wood would through its absorption of moisture be disastrous and would disintegrate the surrounding tissue. There is the same trouble with gold, tin, or lead, or anything else which by dynamic force may injure the integrity of the dentine. Gold fillings are sometimes the greatest enemies to success simply through their density. How much force do we use in inserting fillings? With hand-pressure from forty to sixty pounds; with the hand-mallet from sixty to one hundred and twenty pounds. We leave latent in the filling at least one-half of the force expended, while the resistance of the dentine within the limits of continued vitality is less by one-third or one-half. If we use a material in filling root-canals which will exert a greater pressure than the power of the vital resistance of the dentine, we defeat the object of the operation.

Dr. Marshall wanted to know how Dr. Smith demonstrated that the force of hand-pressure was sixty pounds and of the mallet one hundred and twenty pounds.

Dr. Smith had made a dynamometer some twenty years ago, which,



while not perfectly accurate, was sufficiently so to lead him to these conclusions. He believed that the figures as stated were approximately correct.

Dr. F. Y. Clark, Saratoga, wished to correct an error of statement by Dr. Sudduth, who, if he understood correctly, stated that bacteria were never found in normal dentine.

Dr. Sudduth. They are not found in undecalcified dentine.

Dr. Clark had investigated the subject a good deal. In a number of cases where the end of the root up to the foramen and the cavity in the crown as well had been perfectly filled, he had, after say two years, found an offensive odor. It is difficult to examine dentine under the microscope so as to discover organisms, but by putting a little of the dentine from one of these odorous canals into a few drops of sterilized water and agitating it for a time, the micro-organisms are easily found. It is reasonable to suppose that they were developed from the decomposed tissue of the dentine or were there before the fillings were put in. No matter how thoroughly the canals of devitalized teeth are cleansed, there will always be some animal tissue left, and also a little moisture, to be sealed in when the root is filled. The way to prevent trouble is to cleanse the canal as perfectly as possible. He regards it as almost malpractice to enlarge the canals as is so often done. If too small to permit the entrance of the instrument without enlargement, they will take care of themselves. In operating in these cases he always puts the rubber-dam on, and after the root is cleansed as thoroughly as possible he disinfects completely. For this there is nothing better than pure carbolic acid or creasote, a little of which should be left in the canal, which is then ready to fill. In a tooth so treated there will be at the end of twenty years an antiseptic odor, and there will be no change in the dentine. Fermentation is very easily understood. A grain of sugar or animal tissue placed in sterilized water will show the presence of micro-organisms in twelve hours; in twelve hours more, perhaps, there will be putrefaction. If fermentation were studied more, it would lead to valuable results in the treatment of disease. In the discussion the fact that all canals are not alike seems to have been forgotten. They are found of all sorts and sizes. In some cases one filling will do, and another will not. He uses wood sometimes, and has seen teeth thus filled for twenty years which will compare favorably with any gold or oxychloride fillings. The wood is prepared by reducing it with a draw-plate to little pins the size of a hair. The wood is dipped in creasote or carbolic acid, forced up nearly to the foramen, then withdrawn and cut half-way through at the proper distance from the end. The point is then dipped in chlora-percha and the wood driven quite up

to the end of the canal and broken off at the cut. The foramen is thus perfectly filled, and the root and crown can then be filled with any material desired. What he particularly desires to emphasize is the fact that fermentation goes on in all cases in root-canals not carefully antiseptically treated and filled.

Dr. Barrett could not conceive of the existence of a septic condition of the tubuli. Their contents are albuminous, and coagulate spontaneously immediately after they are severed from vital connection; and after coagulation they are melted down by the action of micro-organisms. This supposes that the influence of micro-organisms is felt in the tubuli. Dr. Miller says the micro-organisms do enter the tubuli. Their enlargement is produced by the presence of micro-organisms. He thinks that all talk based on the supposition that there can be a septic condition of the tubuli before they are acted on by micro-organisms is a mistake. He objects to putrefaction being called a secondary stage of fermentation. Putrefaction is a distinct process; and yet identical, in that it is brought about by the action of organisms, but by an entirely distinct class. It does not succeed fermentation as a rule. When it does, it is because the putrefactive organisms have invaded the fermentative compound and driven out the fermentative organisms. There are fermentations, as the digestive ferments, which are not the product of micro-organisms. After the canal has been rendered aseptic, why should an antiseptic be introduced there? He objects to oxychloride as a root-filling, because its antiseptic properties are unnecessary in a perfectly bland, healthy, wholesome condition of the canal, and because it is an irritant. He wants to put into it something which is as nearly neutral as possible, and that is gutta-percha.

Dr. Allport. What produces gas in the tubuli?

Dr. Barrett. There is no gas in the tubuli. Putrefaction is found in the root-canal, but not in the tubuli.

Dr. Allport. If the dentine of a tooth with a dead pulp is cut, the odor of the excavator or bur would indicate putrefaction in the tubuli.

Dr. Barrett. It may occur after the enlargement and melting down previously spoken of.

Dr. C. S. Stockton, Newark, N. J., wished to correct the statement of Dr. Dwinelle's that the pulp is of no use except to develop the tooth. The speaker does not believe it, and the statement should not be allowed to go out uncontradicted. The pulp was intended to be preserved and to conserve the health of the tooth.

Dr. Dwinelle did not advocate the destruction of tooth-pulps upon the idea that the teeth were just as good without them; but he has in his practice teeth with dead pulps which were properly treated

and which fulfill the requirements of teeth to-day, more than forty years since they were treated, with every evidence that they are in normal condition. They have not deteriorated in color. That teeth which are devitalized are useful is proved by the fact that in extreme old age the pulp and nerve are entirely obliterated. He spoke with some feeling on the subject, because Dr. Shrady, the editor of the *Medical Record*, had attacked us as a profession, claiming that every tooth which was in this state was dead and useless and should be removed as a foreign body, thus showing his ignorance of the subject. The speaker does not by any means recommend destroying tooth-pulps. As far back as 1844 he had advocated the saving of teeth with exposed pulps, and he believed he was the first to recommend that partially softened dentine over nearly exposed pulps be retained. What he wished to do was to put in a plea for the so-called "dead teeth," since Dr. Shrady has attacked the dental profession in such a merciless way.

Dr. Marshall wished to correct Dr. Dwinelle. It was not Dr. Shrady, but Dr. Sexton, one of his contributors, who wrote the article in question.

Dr. Patterson. The blame in this matter should rest where it belongs, on Dr. Shrady. The speaker has recently read Dr. Sexton's book on these subjects, and the dental profession ought to give him the credit of doing more to call the attention of medical men to the obscure diseases caused by reflex irritations and diseases of the dental arch than any other man in the country. He has created a sentiment which has done a great deal of good, and at the same time he has made many glaring errors in his statements as to the possibility of retaining dead teeth in the jaws. But Dr. Shrady's editorial notes have been unjust, unscientific, and sometimes ungentlemanly to the dental profession.

Dr. Sudduth. There are no less than twelve or fifteen kinds of fermentative processes. The simplest and commonest is the process seen in the making of bread. Three or four kinds are found in the mouth in connection with caries. Putrefaction is a fermentative process; the only difference between it and other fermentative processes is that in it there is the odor which arises from the nitrogenous portions of the tissues being attacked. Putrefaction never occurs in the first stages of fermentation, but it may be the second, third, fourth, or fifth stage. As to micro-organisms entering the tubuli, he has gone over the ground pretty thoroughly himself, and he knows that they do not. Dr. Clark cannot see the organisms in normal dentine, because they are not there to be seen. The speaker had worked for two years on that point, and he had never been able to demonstrate them, though they can be found in partially decalcified



fied dentine. The experiment of which Dr. Clark speaks is very crude. Finding micro-organisms in water in which dentine has been washed is no proof that they were in the tubuli of that dentine. It simply shows that they were on the tooth, or connected with it in some other way.

Adjourned to 9 A.M. to-morrow.

#### FOURTH DAY—*Morning Session.*

The association was called to order at 10 o'clock A.M., President Butler in the chair.

Dr. Marshall offered the following as a standing resolution, which was adopted:

*Resolved*, That any member of the dental profession who has been in reputable practice for a period of fifty years may be elected to permanent membership in this association without the payment of dues; and any member of this association who has been in practice for a like period shall have his dues remitted thereafter by presenting the fact to the treasurer of the association.

Dr. Taft, from the committee appointed to prepare suitable resolutions regarding the death of Dr. F. H. Rehwinkel, reported, and the report was ordered spread upon the minutes, incorporated in the memorial pages of the Transactions, and suitably engrossed for presentation to Dr. Rehwinkel's family.

On motion of Dr. Ottofy, a resolution of thanks to such of the railroads as have given the members reduced rates of fare, and to Dr. A. C. Rich, of Saratoga, for his untiring attention to the wants of the association, was adopted.

Dr. H. A. Smith reported that Section VI had selected the following committee to take charge of the work of examining and tabulating pre-historic crania already authorized by the association: Drs. H. A. Smith, H. J. McKellops, W. C. Barrett, Louis Ottofy, and W. Xavier Sudduth.

Section III was then passed.

Section I, Prosthetic Dentistry, Chemistry, and Metallurgy, was called, and the secretary, Dr. W. B. Ames, of Chicago, showed some specimens of removable bridge-work, made by Dr. G. L. Curtis, of Syracuse, and by Dr. Spencer, of Virginia, the latter presented by Dr. Winder, both of which possessed novel features.

Dr. Curtis stated that he had devised the bridge shown to avoid getting into trouble by infringing the Low patent. He has had searches made at the patent office, and finding that the idea did not infringe existing patents he had applied for letters patent to prevent others from obtaining possession of it. The principal points of advantage are that the caps can be put on the teeth independent

of the bridge, and can be left on for any length of time before the bridge is attached. It can be applied to teeth standing in any position in the mouth, and without impairing the life of the teeth by grinding away their surfaces until they stand parallel. It can be made so perfect as to be retained in the mouth by its adaptation with a few drops of chlora-percha. It can be repaired without removing the crowns. The buccal and labial surfaces of the crowns can be, if desired, covered with porcelain. He has made an appliance by which the sleeve and arm can be swaged in twenty minutes.

Section I was passed.

The election of officers and selection of the next place of meeting were then proceeded with, resulting as previously announced.

The following amendment to the constitution was proposed by Dr. Cushing, and adopted by unanimous consent:

To amend Article III, section 5, of the constitution by striking out the word "signify," and inserting in its place the following words: "sign a statement in a book to be kept for that purpose, signifying," making the first sentence in Article III, section 5, read as follows:

SEC. 5. *Permanent Members*.—Permanent members shall consist of those who, having served one year as delegates, and complied with the requirements of the association, shall sign a statement in a book to be kept for that purpose, signifying to the treasurer a desire for permanent membership.

On motion of Dr. Allport, a change in the time of meeting next year was suggested to the officers, so as not to conflict with the meeting of the International Medical Congress at Berlin.

The newly-elected president, Dr. M. Whilldin Foster, Baltimore, was then escorted to the stage by Drs. Harlan and Perry, and, on being introduced, briefly thanked the association for the honor conferred, and shortly reported the committee appointments, which will be found in the DENTAL COSMOS for September. The newly-elected vice-presidents, Drs. Harlan and Patterson, were then installed, being conducted to their seats by Drs. Stockton and Curtis.

The association then adjourned to meet at Excelsior Springs, Missouri (near Kansas City), the first Tuesday in August, 1890.

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## SOUTHERN DENTAL ASSOCIATION.

(Concluded from page 811.)

### SECOND DAY—*Afternoon Session* (Continued).

THE Committee on Education was called, but owing to the illness of Dr. Geo. Eubank, the chairman *pro tem.*, was passed, and the Committee on Hygiene was called.

Dr. W. W. H. Thackston, Farmville, Va., said that, having only

been appointed acting chairman since the association convened, he had not had time to prepare such a report as the subject ought to have; but he had concluded to say thus much: At the meeting last year in Louisville there was read a paper by Dr. Geo. J. Friedrichs which embodied all the advances, all the knowledge of which he was master on that theme. He regarded that paper as the most complete and most satisfactory presentation of the subject within his knowledge. Its general scope and tendencies present all that he could say, and if it needed a supplement, our president's address in opening this meeting will supply it. He thought he was doing the best thing possible under the circumstances in commending these two to their attention. From them they would derive all that is at present known beyond controversy upon the subject of hygiene.

The subject was passed.

The Committee on Histology and Microscopy was called, and on motion of Dr. B. Holly Smith, Jr., was passed.

The Committee on Pathology and Therapeutics was called, and Dr. Andrew G. Friedrichs, New Orleans, read a paper entitled "Reflex Neuralgia Dependent upon Dental Irritation." The writer is daily convinced that the hidden springs causing neuralgias of the trifacial nerve are in the majority of instances unsuspected by the general practitioner. Every other possible cause is considered, oblivious of the fact that dental irritation is one of the commonest and most powerful causes of reflex nervous disturbances. Dental irritation gives rise to neuralgia of the face, of the eyes, ears, stomach, neck, shoulder, and in rare instances there appears to be a special communication between the fifth nerve and those of the arm. Neuralgia is a symptom, and the pain is due to some morbid condition or to some irritation of a nerve. The essayist then recited a number of cases demonstrating the protean manifestations of reflexed dental irritation. The cases cited, some of which were quoted from Garretson's "Oral Surgery," embraced neuralgia of the face, ear, and scalp; of the neck and arm; of the eyeball and face, with alteration of the color of the iris; chronic trismus; intense and general neuralgia; wryneck; neuralgia of face, neck, and arm, with partial paralysis of the latter; and neuralgia of the stomach, all promptly cured by attention to the teeth, which were in most cases not suspected by the general practitioners consulted by the patients.

In view of these facts, it is charlatanism to tell a patient who consults you for relief of a facial pain that he has neuralgia, that his symptoms are his disease. So-called facial neuralgia is regularly treated as if it were *sui generis* and not dependent upon a definite cause, when in most instances the origin of the pain stares one in the face the moment the mouth of the patient is examined, and is



only obscure to the inexperienced or superficial observer. It is not uncommon for patients to be treated for weeks or months for neuralgia, the description of whose symptoms alone would indicate to the specialist that they arose from odontitis or periodontitis, or from inflammation of the lining membrane of the antrum, and this apparently without the least suspicion on the part of the medical practitioner as to their real origin.

Dental irritation is by no means the sole cause of facial reflex pain, as syphilis, malaria, uterine disturbances, tumors, etc., frequently induce it. But in making up the diagnosis the teeth should not be ignored. Can there be found a more facile arrangement for the taking on of neuralgic influences than the nervous connection of the teeth? The ramifications of part of the fifth nerve end in the dental pulps, where inflammation (increased circulation) is denied expansion by the osseous walls, and the entire pressure is transmitted back to the brain and every sense. But neither should the teeth be condemned without a thorough examination because of failure to find a cause in other directions. Even where the sufferer indicates a certain tooth as the seat of pain, careful examination shows some other member, perhaps in the opposing jaw, to be the offender.

The location of the cause of the disturbance may usually be discovered in apparently obscure cases by examining with a mouth mirror and probing every surface and cavity about the teeth. When the offending member is touched, the patient's nervous system will probably inform you of the fact by the vigorous manner in which it resents the contact. Failing in this, observe if any of the teeth is discolored or more opaque than its fellows, which indicates that the pulp has been destroyed. Such teeth are frequently the seat of periosteal inflammation and reflex trouble, and they are usually more sensitive than their neighbors. Other appearances and indications will be recognized by experience. Among the diseases which may cause neuralgia are chronic inflammation of the dental pulp, difficult eruption of the wisdom-teeth, crowding of the denture, secondary dentine in the pulp-chamber, decomposition of a dead pulp in a confined space, exostosis, alveolar periostitis, filling upon an exposed pulp, exposure of sensitive dentine, roughening of the root by absorption, etc., the most common being the first named.

Dr. Beach announced that the Executive Committee had selected the following gentlemen to hold an oral clinic, and give instructions and suggestions as to the treatment of cases submitted to them: Drs. W. H. Morgan and J. Y. Crawford, of Nashville; H. J. McKellops, of St. Louis; B. Holly Smith, Jr., of Baltimore.

Adjourned till 2 o'clock to-morrow afternoon.

THIRD DAY—*Afternoon Session.*

The association met pursuant to adjournment, President Crawford in the chair.

The consideration of Pathology and Therapeutics was resumed, and Dr. W. J. Barton, Paris, Texas, read a paper entitled "The Influence of Heredity."

The secretary read a paper by Dr. G. W. Rembert, Natchez, Miss., entitled "Root-Filling *versus* Nerve-Capping."\*

Dr. Rembert's experience and observation confirmed the opinion that root-filling as a practice is far more certain, and attended with better results, than is promiscuous nerve-capping. In the fifteen years of his practice he had read seven-tenths of all that has been published on the subject of nerve-capping, and he had experimented,—nerve-capping is but an experiment always,—employing all the care and skill at his command; and in the large majority of cases, rarely exceeding four years from the time of the operation, he had a dead tooth as the reward for his labors. The successful cases, almost without exception, were those in which he adopted the following procedure: Combine into a thin paste with either wood creasote or carbolic acid powdered oxide of zinc, and spread lightly over the entire surface covering the exposed pulp, being careful that no pressure is made upon the pulp at the point of exposure. Next mix a thin paste of oxyphosphate of zinc, or what is better, agate cement, which is spread gently over the surface of the first, still avoiding pressure upon the pulp. Usually the entire cavity is filled with the preparation, which, after hardening, is excavated and filled as any ordinary cavity. By this method success will be secured where success is attainable, but a larger proportion of even these cases are failures than where devitalization and root-filling are practiced, more especially in pathological exposures. Simple traumatic exposure—in excavating—when there has been no previous pain, and in a cavity favorable in form and location, can be capped with every assurance of success. But the writer believes that the capping of exposed, inflamed, congested, and partially suppurating dental pulps is largely unsuccessful. In these cases he would devitalize and extirpate the pulp and fill the root. In these last he would not include *nearly* exposed pulps having only a thin covering of softened dentine, but which have never given evidence of pathological disturbance other than slight temporary sensitiveness under specially irritant action. These most anyone can cover and feel pretty certain of no after-trouble.

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\* This paper, it was explained by the president, should have been read under Operative Dentistry, but was not received until too late.

The method of filling roots he usually employs is as follows :

Devitalize the pulp with arsenic, commonly using the devitalizing nerve-fiber made by The S. S. White Dental Mfg. Co. Notwithstanding the objections against arsenious acid, he has, after fifteen years' use of it, only just enough fear of it to make him careful in its use. He believes that damage from its use in devitalizing pulps is the result of ignorance or carelessness. Sometimes in hyperemic pulps arsenic seems powerless to destroy vitality. In such cases he depletes with an ordinary excavator, and after the hemorrhage has subsided, applies carbolic acid (full strength) freely, afterwards inclosing some of the acid in the cavity with a filling of gutta-percha or agate cement. In three or four days the pulp can, as a rule, be removed painlessly. Sometimes the portion of the nerve in the root is highly sensitive and unamenable to devitalization by any drugs he has ever tried. In such cases he caps the vitalized portion.

After destroying the pulp and removing the débris, the cavity is enlarged with chisel and engine-burs until the entrance to each canal is brought into good view. Plenty of room is necessary, even at the expense of the loss of tooth-substance. The direction and length of the canal are next determined with an explorer. The canal is then enlarged with flexible drills and burs, beginning with the smallest, as near to the foramen as possible. This can only be done, of course, where the roots are nearly or quite straight. When the root is so curved as to risk drilling through the side, he discontinues the work, taking the chances on its aching, which it rarely does. Though he has drilled through the side a few times, he believes little harm is done, provided the operator does not fill through the side opening. For filling roots he prefers gold foil No. 4; next to this tin foil or a paste of oxide of zinc and eugenol, which latter he deems especially valuable where there is abscess and the apex has been absorbed and the foramen is large. The gold foil is cut into strips of one-fourth sheet each, rolled on a three-sided broach into cylinders of greater length but less diameter than the canal. These are carried to the end of the canal with a small root-plugger, first being dipped into carbolic acid as an antiseptic precaution. After filling two-thirds or three-fourths of the root, he usually fills the remainder, including the pulp-chamber, with agate cement.

In conclusion, the writer believes that fully sixty if not seventy-five per cent. of pulps capped because of pathological exposure are failures, and that with the same skill and care in filling the roots of recently devitalized teeth not more than ten per cent. are failures; that general and promiscuous nerve-capping has less of conservatism



than root-filling, entails additional labor on the dentist, and expense and suffering on the patient.

Dr. J. H. Lasater, Belton, Texas, had had a case which illustrated the idea advanced in Dr. Friedrichs's paper. A lady came to him with an abscessed first left superior molar, from which she had been suffering some three months. Her left eye was discolored, and she told him she could hardly see out of it. He extracted the tooth, and in six weeks the eye was all right. Some time later the patient had the same trouble on the right side of the face. It was treated similarly, with the same results. There was no question in his mind that the trouble in the eyes was a reflex from the abscessed teeth.

Dr. T. M. Milam, Washington, Ark., stated a case which had mystified him. A young man, twenty-one years old, after suffering for three weeks from neuralgia, which physicians were unable to cure, wrote to him to come and bring gas to extract his teeth. Knowing that the teeth were sound, he refused, but expressed his willingness to cure the neuralgia with the remedies known to the patient's medical advisers. Without replying the young man presented himself, looking much emaciated, and demanded the extraction of the right superior second molar, which was in a high state of inflammation, and abscessed, though perfectly sound itself. Patient had been in usual health for a year, but on examination he was found to be suffering from chronic nasal catarrh with hypertrophy of the tonsils. The speaker advised him to go under treatment, but he failed to do so. Nine days later he returned and demanded the extraction of the corresponding tooth on the other side, which was refused, and he was again advised to have his nose and throat troubles cured. When last heard from he was much improved and had no neuralgia. The speaker was not prepared to say that the neuralgia was due to nervous reflex action; but if not, what was the cause?

Dr. N. T. Shields, Galveston, rose to a question of privilege. The method of filling roots of which he spoke the other day had been questioned in his absence. He considers filling roots with amalgam to be a scientific operation; filling with wood or lead is not scientific. With gold, oxychloride, or amalgam it is scientific. Dr. Shields then described his method, which is stated at another portion of this report.

Dr. H. E. Beach, Clarksville, Tenn., was not present to hear Dr. Barton's paper, but he had heard that of Dr. Friedrichs. Its writer stated many things we all know to be facts as to what reflex nervous action is. This thing of reflex nervous action, arising, as it may, from any tooth-lesion, has never been fully understood, nor has the trouble been intelligently treated by four-fifths of the dentists nor by nine-tenths of the medical men. Dr. Friedrichs referred

to the lack of attention paid to the teeth by M.D.'s, as a cause of neuralgias, but the speaker is happy to say that the medical profession are beginning to recognize the importance of investigating first and foremost in neuralgic affections the teeth of the sufferer, and of having the investigation made by one who is competent. He believes there is not a respectable practitioner of medicine within reach of his place who does not recognize that more pain of the face arises from tooth-irritation than from any other cause. If the trouble does not arise from the teeth, the physician knows what to do. He then knows that malaria or some other similar cause is at work. The speaker has known reflexes from irritation of the teeth to affect not only the eyes, but the ears, the throat, and the muscular action of the arms. Persons have complained of pain in the lungs, when there was only a muscular trouble caused by irritation of the teeth. A lady, a music-teacher, complained of pain in her chest, which was cured by the extraction of an abscessed tooth. In another case, also a music-teacher, the arm of the patient was almost entirely paralyzed, due to the same cause,—an abscessed tooth, which had been dead for fifteen years. We know that reflex nervous action from the teeth has much to do with pains about the head, face, chest, and arms, and we should take every opportunity to impress on young medical students the importance of taking account of them in determining the cause of neuralgias.

Dr. W. H. Morgan, Nashville, Tenn., wanted to commend Dr. Rembert's paper as almost faultless. As he happened to know that Dr. Crawford had been giving considerable attention to reflex nervous action from the teeth, he hoped that he would give his views upon the subject.

Dr. Crawford called Dr. Storey to the chair, and said that he could commend earnestly the main points of the paper read by Dr. Friedrichs. What is nervous reflex action? It is the manifestation of the phenomenon of pain in some organ or tissue of the body remote from the point of irritation or diseased condition giving rise to the trouble. Long-standing conditions of sympathy of a high grade very frequently give rise to persistent and obstinate inflammations through nervous reflexion.

You cannot place a pin-point on the external surface of the body without its being brought into contact with a nerve which transmits to the brain the sense of touch. We can readily see how irritation of the pulp of a tooth gives rise to so much pain, because the pulp is a ganglion, not a peripheral termination of a nerve. That is why we have such a wonderful response to pulp-irritation. Our profession, as a whole, has not properly understood the consequences of dental nervous reflex action, or the knowledge would have

gone to the medical profession and to the public. So far as neuralgia of the upper portion of the body is concerned, it is like a gum fistula, it depends on a dental lesion primarily. He challenged the medical world to disprove that, barring the exceptional cases which arise from accidental injuries, neuralgia about the head and face almost always depends for its origin on irritation of a dental nerve. It may depend on various things, of course, but as a rule, when there is a mysterious neuralgia, and especially when the pain comes on periodically, it is a reflex action from a dental nerve. The wisdom-teeth are especially prolific of such troubles, but most of it, barring that which comes from enlarged roots, is amenable to treatment in from ten to thirty minutes. Dr. Crawford recited a case of occipital neuralgia caused by partial exposure of the pulp in a lower wisdom-tooth, which was cured by extracting the tooth. Our associates in medicine need to be waked up, and our own profession needs to be waked up to the need of rational treatment—rational surgical treatment—in these cases. The most pernicious type of neuralgia is that which is brought about by septic influences as a sequel to some traumatic injury, in which paresis or paralysis of the nerve affected sometimes follows.

Dr. McKellops, chairman of the Committee on Appliances, presented a partial report, commending a number of appliances submitted to them.

Dr. Geo. S. Staples, Sherman, Texas, thought that it ought not to be necessary to urge dentists to do their duty. We make complaints of the ignorance of medical men on dental subjects, but he finds that he can readily wake them up in his part of the country to the necessity of a closer connection between dentistry and medicine. There are about fifteen or sixteen physicians practicing in Sherman, and of these at least twelve send for the dentist whenever there is the least ground for suspicion of the teeth. To gain the confidence of the medical men we have only to do something to interest them in our work, and it is not hard to do so with intelligent physicians.

In regard to the part played by reflex action, he would relate two or three cases. The first occurred some twenty-five years since, just after he began practice. Some fifteen miles away from his home he was called to see a patient, a lady who was totally blind, except that she could distinguish daylight from darkness. The oculist who was treating her knew something of reflex action, and asked him to examine her teeth. Some of these were badly decayed, with exposed pulps, fit subjects for the forceps only. He extracted them, and the lady never had to go back to the oculist. Since he had been practicing in Texas he had treated a somewhat similar case where the patient had been under the care of the best physicians in New



York City. The patient, a man, was totally deaf, and suffered periodically from very severe neuralgias, during the paroxysms of which he wished he was dead. He was on a visit to Sherman, and the suggestion was made that possibly his teeth were at fault. On examination the speaker found the upper left second bicuspid dead; the tooth had a beautiful filling in it. On tapping this tooth with an instrument the patient almost jumped out of the chair. On further examination he became satisfied that the trouble was a diseased antrum, and he thought it was engorged. He extracted the tooth and found a small collection of pus, with an opening into the antrum the size of the tooth. On passing a probe in he found the antrum so full that there was no cavity. For two weeks he tried cauterization to empty it, but made small progress. At the end of that time he took a curved bistoury, made hash out of the mass, and then syringed it out. The deafness shortly left the patient, and there was no return of the trouble. The third case was that of a lady who suffered all of one winter from neuralgia in the left arm and shoulder. Late in the spring, the upper wisdom-tooth on that side, which was a wreck, got too long for occlusion. He was away from home, and the physician, in attempting to extract the tooth, nipped it off. On his return the lady called on him. He found that she had excellent teeth except the superior wisdom-tooth on the right side, which was also a mere shell. He extracted the root of the tooth which had been broken, causing immediate relief of the neuralgic symptoms; but in less than twelve hours the patient had the same trouble on the other side. He then took out the right upper wisdom-tooth, and there was no further return of the pain.

Dr. E. D. Andruss, Dallas, Texas, related the case of a lady whose left arm was paralyzed, which was cured by the extraction of a tooth with an exposed pulp. In the *Lancet* fifteen hundred cases of deafness were reported, of which five hundred were due to dental lesions; in the large majority there was no trouble with the teeth. He would ask advice in a case now in his hands. A lady complains of a dead, heavy pain of the left side of the face. He has examined the teeth thoroughly, and can find no deficiency among those on that side of the face. They give no response to heat or cold, but tapping the first molar on the opposite side makes the patient flinch slightly.

Dr. S. G. Holland, Augusta, Ga., was glad to see a discussion like this. It is true that the subject is less understood than most others. Physicians are often mistaken, and we are often mistaken also in our judgments. If we were more careful in diagnosis, we would have more cases of the kind sent to us. Too many get into a rut in such matters, and fail to put each case on its own merits. By

taking care that no factor is overlooked we will largely enhance the value of our counsels.

Some time since a surgeon, one of the best in the South, had called him in to see a patient suffering from a trouble in the antrum from a pistol-shot wound received over a year previous. He took a suitable instrument and found there was engorgement of the antrum. The question was how to get the pus out. He extracted a bad tooth, opened through the socket into the antrum, and removed the pus without difficulty, and a cure was readily effected. A young lady who had suffered for three years with an abscess under the symphysis of the jaw, during which time she had been treated by her uncle, a well-known physician, was sent up to Dr. Westmoreland, who, failing to locate the cause of the trouble satisfactorily, called the speaker in to see if the teeth might have anything to do with it. On examination there was no discoloration about the teeth over the abscess, but with a probe he found necrosis about the roots of the two lower centrals, which were dead. The patient had suffered before suppuration began with severe pains in both ears for six or eight months; then the pains gradually left her. He extracted the offending teeth, cut away the necrosis, and sent the patient home. In six weeks she had completely recovered. The origin of all the trouble was accidentally biting on a chicken-bone.

He has found sodium salicylate an excellent remedy in many cases of neuralgia. For a lady suffering from neuralgia in the left side, arm, and limb he prescribed the sodium salicylate, sixty grains, to be made into six powders, one to be taken every two hours; then omit for six hours, after which repeat the powders. He does not believe that ninety-nine out of one hundred cases of neuralgia arise from the teeth, but he is satisfied that a large majority do.

In reply to questions, Dr. Holland said that in treating antral troubles it is best to get at the cavity from the bottom. Pus and other débris are thus more readily removed. Some diseases of the antrum are cured merely by the extraction of a tooth which has perforated the floor. Sometimes, however, they are obstinate; but if there is no necrosis, with a good opening secured, the disease will usually cure itself. He has now under his care an interesting case which, though not an instance of reflex action, he is tempted to speak of. It is a little girl, about five years old, just now ready to erupt the first permanent molar, whom he has been treating for nearly a year. About a year previous to her coming into his hands a physician had extracted a dead second deciduous molar, which was followed by swelling and soreness. At the time he first saw her the jaw was still swelled. An examination revealed considerable necrosis. He took out at first a piece of bone three-quarters of an inch long. He

then found another, and some pus continued to discharge. He has been working upon the case with aromatic sulphuric acid, and has taken out four pieces of bone which have sloughed off, and he now thinks there is no more necrosed bone there. The father of the child told him the day before he left home that the jaw was almost normal size.

The subject was passed.

The secretary read a letter from Dr. Louis Ottofy, Chicago, calling attention to the movement inaugurated by the Illinois State Dental Association looking to the tabulation, from a dental standpoint, of the pre-historic skulls in the various institutions of the country.

The Committee on Chemistry was called, and Dr. D. R. Stubblefield, Nashville, Tenn., chairman, read his report, of which the following is an abstract:

We stand to-day in the immanent presence of untold overpowering possibilities. The scientific world is to-day uneasy with the preparatory pains presaging the advent of new, not to say greater, things in every department. Everyone who had the privilege of a regular curriculum remembers that the most despised, obscure, and generally uninteresting branch of the whole course was chemistry. The result quite naturally was that chemistry was voted a bore. But chemistry has lately become the most fruitful source of contributions to our materia medica. All of the new remedies, or almost all, are products of synthetical or analytical work in the laboratory. Carbolic acid—phénol—heads the list of analytical products. Just now we are getting acquainted with a class of agents—synthetical products—which bid fair to show themselves valuable,—antipyrine, antifebrin, and phenacetine. Others are being formulated; just as in everything else, one discovery begets another. The object of this paper is not, however, to discuss these remedies, but to make clear the fact that in chemistry we find the richest source of valuable agents. This branch should be more attended to in the literary preparation of students for the prosecution of dentistry. Professional schoolmen have a right to expect that students shall be generally well grounded from a broad literary standpoint, so as to enter intelligently upon the work of obtaining their special qualifications.

Adjourned till 9 o'clock to-morrow morning.

In the evening, after their return from an excursion to the jetties, the members held a social reunion in the clinic-room. Those who have attended on similar occasions need not be told that it was an enjoyable evening. While the festivities were at their height, President Crawford rapped for order, stating that he had been requested by



the constitutional number of members to call a special session to consider a matter which could be better attended to at that time than at any other.

Dr. Thackston then read the following resolutions:

GALVESTON, TEXAS, August 24, 1889.

WHEREAS, Recognizing and appreciating the courtesy and kindness of the house of The S. S. White Dental Manufacturing Company, of the city of Philadelphia, in supplying at its own cost of time and labor all the instruments, chairs, and other appliances and requirements for our clinical operations and demonstrations, not only for the present occasion, but for many of the former anniversary meetings of this association, therefore

*Resolved*, 1st. That the hearty thanks and proper and becoming acknowledgment of the obligations under which we rest be tendered the representatives of the said house of The S. S. White Dental Manufacturing Company, of Philadelphia, the proprietors and attaches; and *especially* are our thanks and warmest regards and remembrances due our true and long-tried friend and co-laborer, the friend and comrade who has nobly and gallantly stood by us in every emergency, and by his aid and assistance has contributed so largely to the success of all our meetings, both State and sectional, Col. J. W. Selby.

*Resolved*, 2d. That these resolutions be entered of record, and made part of our regular and published Transactions, and that our corresponding secretary be directed to transmit copies of the same to Dr. James W. White and Col. J. W. Selby, of Philadelphia.

W. H. MORGAN,

W. W. H. THACKSTON,

*Committee.*

The resolutions were seconded in a brief speech by Dr. Stubblefield and unanimously adopted, and the special session adjourned.

#### FOURTH DAY—*Morning Session.*

The association met at 9 o'clock, President Crawford in the chair.

On resuming the consideration of the subject of chemistry, Dr. Holland said that he had prepared a paper, but had mislaid it. He agreed in the main with the ideas contained in Dr. Stubblefield's paper. It is deplorable that we do not know more of chemistry than we do. We see chemistry everywhere. It is only a few hundred years since there were but four so-called elements known. To-day there are about seventy recognized, and another is expected. Chemistry is the science of the atom. He saw the need of a better knowledge of chemistry in the discussion on root-filling. Some of the speakers forgot that they were dealing with chemical compounds. When we know more of chemistry we shall be better able to treat the diseases which come under our care, though some dentists do affect to know nothing of chemistry. He thought that in the discussion on operative dentistry Dr. McKellops went a little too far. He said he never used amalgam, and he seemed to have a special

spite against mercury, which he said would destroy bone. Now, mercury is an element, not a compound, and there is nothing in it as an element that will destroy bone. We have it on the best authority that a really good amalgam is more compatible with soft tooth-structure than is gold. Some believe that it is to some extent a disinfectant and produces an antiseptic condition which tends to preservation. All the theories which have been promulgated for the explanation of decay of the teeth are at bottom chemistry. For filling roots there is nothing better than gold where the roots are straight and readily got at; in crooked roots, chloride of zinc can be pumped up. We shall know more about the teeth and their diseases after awhile, and chemistry will be one of the most prominent factors in bringing us to that knowledge.

Dr. Morgan said that, being interested in general and special education, this subject always elicited his hearty attention, but the field is so vast and so much of it is unexplored that he cannot hope to cover it. He agreed with the paper and with the last speaker in the main, though with a difference. The form of everything depends on chemistry. When we come to treatment, there are some cases which come under the domain of chemistry alone; but in this human organism there is something else to be considered,—a vital spark, a soul, which takes cognizance of all that is done. There are some parts in which the vital force is scarcely to be considered, but there are other parts where the influences which govern the case are yet to be developed. There is such a thing as psychological medicine, where the disease is reached and cured without the use of chemical remedies,—where the imagination has a large share in controlling its progress. But the field of chemistry is so wide that in our teaching we must confine ourselves to a comparatively narrow space. It is difficult to differentiate between what is necessary and what is unnecessary for the student in this direction. We have really no text-book on chemistry adapted to the needs of dental students. He believes the State boards in their examinations branch out too far in this subject, going, in some cases at least, even into the domain of pharmacy. What is needed in a text-book for our students is a condensation of the facts which come within the purview of dentists. Many things in chemistry are of no value to them. He hoped that those who send up students to the dental colleges will take more care in preparing them with regard to this branch, so that they will not enter college with the idea that chemistry is not of much value to them and is therefore to be neglected.

Dr. Holland had no idea what the soul is. The physical organization of man is all chemical. Psychological cures depend on the predominance of the mental over the physical.

Dr. Storey. A batch of dough is a mechanical mixture. The tin, silver, and mercury in an amalgam are a mechanical mixture, not a chemical compound. One of the speakers spoke of the use of chloride of zinc in filling roots. Chloride of zinc is one of the most powerful corrosive agents; if he had said oxychloride, all right.

Dr. McKellops. Chloride of zinc is one of the best remedies in the treatment of diseases of the gum and pyorrhea alveolaris.

Dr. Storey used it commonly for those purposes, but he did not fill teeth with it. It is a standby in the treatment of pyorrhea.

Dr. Stubblefield had just come in in time to hear a doubting Thomas say that amalgam was not a chemical compound. There is always a chemical union of the components of an amalgam. You may mix molten metals of different specific gravities, and on allowing them to cool slowly they will separate, and the heavier will sink; but this is not an amalgam. You must have the mercury in combination to form an amalgam. If there were not a chemical combination, the metals could be readily separated from one another; but an amalgam cannot be split up into its component parts without the aid of chemical action. That ought to be sufficient proof that the metals are in chemical combination. He thinks the average dentist has only a vague grasp of the subject of chemistry, which makes it incomprehensible to him and therefore of no value. It can be made a source of living interest, and he insists that it is expedient for dentists to know more about it than they do. The best field to effect a reform in this matter is among the young men who are to come into the profession. If they can be properly instructed, the work will be accomplished.

The subject of chemistry was passed.

Dr. McKellops submitted a further report from the Committee on Appliances.

Dr. N. T. Shields presented the tooth with the root filled with amalgam as reported in the last issue of the DENTAL COSMOS, page 806.

On motion of Dr. Morgan, Dr. Holland was requested to forward the paper of which he had spoken to the Publication Committee.

A communication from Hon. R. L. Fulton, mayor of the city, was received, inviting the members to attend a performance at the Harmony Theatre in the evening, which was accepted with thanks.

The Committee on Mechanical Dentistry was called, and Dr. E. E. Spinks, Meridian, Miss., acting chairman, reported that no papers had been offered.

The president stated that a paper had just been received from Dr. J. L. Mewborn, Memphis, Tenn., which would come under the subject of mechanical dentistry.



Dr. Mewborn's paper was read by the secretary. It described an apparatus which he had constructed to remedy a very serious facial disfigurement produced by a gunshot wound. The patient, a young man, when nineteen years old, had been injured by the accidental discharge of his gun while hunting. The charge had shot away a portion of the right side of both lips, almost the entire nose, and the right eye. A rhinoplastic operation had been attempted, but erysipelas set in and it had to be abandoned. The patient was then brought to Dr. Mewborn, who constructed an appliance consisting of a strong gold plate with strong stays and clasps to the molars and bicuspid, with the lost incisors attached, and the plate projecting under the lip, terminating in a flattened spine or tube to pass through the opening left by the loss of the nasal spine, forming a socket for the support of the nose. A nose was modeled out of sheets of pink wax on an accurate plaster impression, and by frequently trying it on the patient the size, proportions, and expression desired were obtained. A square gold pin or tenon previously fitted to the socket was inserted in the columna; and a T-shaped piece of plate was placed so as to project downward and outside of the lip, and to this an artificial moustache was to be attached. The wax model was then reproduced in English pink rubber, which was given an emery-paper finish, and made thin and light by burring out from the inside. The moustache was then attached. The feather edge of the nose scarcely shows the line of contact. The apparatus was completed with a pair of ear temple glasses, one of which was of smoked glass to hide the lost eye. The effect was pleasing, the best evidence of which is the fact that the patient has since married.

[The paper was accompanied by illustrations made from photographs before and after the appliance was adapted.]

Dr. B. Holly Smith, Jr., thought it would be well if there were more reports of such cases. This was undoubtedly a successful case, but he had never before seen pink rubber used, and the effect might possibly have been better if soft rubber had been employed and the nose freshly painted from time to time. Surgeons in his city now send all such cases to dentists.

Dr. Staples has been paying some little attention to aluminium as a base for artificial dentures, and he would like to know the experience of others with it. He has put in several cases, and the patients say they would not wish to go back to rubber.

Dr. Storey had just recently put in an aluminium plate, swaged up in the same manner as gold, to cure a rubber sore mouth. It is easily swaged, being not much harder than lead. In the case mentioned he had hammered it up to shape with a horn mallet and made a perfect fit easily, the teeth being attached with rubber.

The curative process was going on very satisfactorily, and quite rapidly, though it had only been in five days. He has seen only three rubber plates which had been worn any length of time which did not make the mouth sore.

Dr. Staples had been induced to take up aluminium by the case of a lady for whom he made a gold plate some three or four years ago. It was an excellent month to fit, and the patient complained at first that the plate was too tight. In a year it had to be lined, as it had become so loose as not to stay up well. Then just before he started to the meeting at Louisville last year the patient came into his office again, with her mouth in a bad state. He told her it would be useless to try to make a rubber plate, and advised her to wait until his return. Upon getting home again, he made a plate of aluminium, which was inserted last November, and the patient is perfectly satisfied. There has been no trouble since, and it is now nearly a year.

Dr. S. S. Shackelford, Austin, Texas, formerly had a great deal of trouble with rubber plates, but for the past six months he has used black rubber for lining them, and has so far been very successful. Of course, six months is not long enough for a conclusive test.

Dr. T. L. Westerfield, Dallas, Texas. A pair of shoes, if they don't fit, will hurt the feet. So with plates for artificial teeth. If they don't fit, no matter what the material, they will cause trouble. He thought the older members could probably tell of the same difficulties with gold plates that are so often found with rubber. He thinks if the rubber plate is made to fit the mouth there will be no trouble.

Dr. Thackston was opposed to the use of rubber, though he has made a few cases of it. He lines them with Daly's or White's gold lining, and has not had a single instance of ulcerated sore mouth. The lining lasts well, and seems to be a protection to the soft parts.

Dr. A. P. Johnston, Anderson, S. C. There are only three causes of trouble with artificial dentures: Bad-fitting plates, permitting them to get filthy, and constant wear. An artificial denture should be left out of the mouth at night. The filthiest plate he ever saw was a gold one. Rubber is harder to keep clean than gold. As to aluminium, he had never seen anyone who could testify to great durability for it. It is easily cast to fit, but it is difficult to use with gum teeth. When we use them with the aluminium base, we have to make pink rubber gums, which is not always allowable. The electro-metallic plate is another device for which great advantages are claimed, but it is said that it cannot be mended in case of accident. He did not know as to that, but he had performed an experiment with an electro-deposited tooth, and he had had no difficulty in soldering that.

Dr. M. E. Tarvin, Galveston, Texas, was a student at the time Dr. Bean was teaching his process of swaging aluminium. The trouble then seemed to be in soldering it. Then again the saliva in some mouths acted upon it and destroyed its usefulness. When melted, it would not flow easily. Dr. Carroll has invented an apparatus for casting it in which he uses atmospheric pressure to cause it to flow where he wants it. The drying process shrinks the model a little and makes a tight fit for the plate.

Dr. McKellops. Of the strength of aluminium there is no doubt. The government wants to make ships of it. Dr. A. O. Hunt commends Dr. Carroll's process, and he finds many others who do mechanical work speaking highly of it. He was one of the earliest pupils of Allen and Hunter, and he has always favored continuous-gum work, and there is nothing else which gives such opportunities for results in expression.

Dr. N. T. Shields. Sore mouth is caused by the non-conductibility of the plate. With few exceptions rubber causes sore mouth, and, as a rule, a metal plate will cure it. Continuous-gum work is the prettiest in the world, but he would advise those who make it not to use pure platinum, as it will warp. If they will use the platinum and iridium made by The S. S. White Dental Manufacturing Company instead, there will be no warping.

Dr. Morgan. Rubber is a poor conductor, not a non-conductor, and all this talk about its heating the mouth is arrant nonsense. The temperature under the plate is no higher than that of the mouth until there is a diseased condition. Heat tends to an equilibrium. That a rubber plate can produce heat is impossible unless there is chemical action. The reason why there is so much complaint of sore mouths from rubber plates is that they are not made properly. He has been lining them for several years with The S. S. White Dental Manufacturing Company's or Robinson's material. So made they are readily kept clean. One of the worst cases of sore mouth he ever saw was under a gold plate. As to the electro-metallic plate, it makes a beautiful fit, the best he has ever seen. It is, he understands, a silver plate covered with gold. First they deposit a layer of gold, then silver to make the plate stiff and strong, and then another layer of gold. It certainly will fit the model. He had a difficult case, for which he had made several plates, but they would not stay in place. Finally he sent a model of the impression to the manufacturers of the electro-metallic plate, and they returned a perfect fit. After some time the plate got cracked and he sent it back for repair. The repair looks very well. If there is a fault in this method, it is that they do not deposit enough gold. The silver—if it is silver—is the stiffest he ever saw, but they will



have to increase the quantity of gold used. On the whole, he is strongly inclined to regard the electro-metallic plate as a valuable contribution to prosthetic dentistry. One of the speakers spoke of the models shrinking. Plaster does not contract. It swells in crystallizing, and when the moisture evaporates it is left porous. One word more. He sometimes sees dentists wearing artificial teeth of a different color from their natural teeth. This certainly ought not to be.

Dr. Holland has had much experience with continuous-gum, and where he can he always uses it. It is the cleanliest and prettiest artificial denture made, and affords the greatest facility for getting the natural expression. It contracts slightly, and sometimes requires a little scraping out between the heels to make a perfect fit. He abominates the old-style gold plate, for it is filthy, and he dislikes wholesale bridge-work for the same reason. He does not like the aluminium plate because it is acted on by alkalies. He believes that nine out of ten sore mouths are produced by lack of cleanliness on the part of the patient. If, after eating, the patient will be careful to clean his plate, there will rarely be trouble. A rubber plate will not heat above the temperature of the mouth, but it holds the heat of the roof of the mouth, and prevents it from passing away.

Dr. Morgan. Substances collect on plates which simple cleansing with water will not remove. They become coated with sticky, oily, gummy débris. A little aqua ammonia in the water used for cleaning them will accomplish the removal of this. The teeth should, of course, be taken out of the mouth at night.

Dr. C. B. Lewis, Dallas, Texas, and E. E. Spinks, Meridian, Miss., had had satisfactory experiences in a few cases with the electro-metallic plate.

Dr. Crawford thought that the principal factor in the production of sore mouth had been overlooked,—that is, improper occlusion. Bridge-work is the greatest advance in this department of late years, and it offers the means for lifting prosthetic dentistry out of the slough into which it has fallen. The bones of the face are the last to complete their development. Extraction of teeth before the development of those bones is completed is the bane of American dentistry. He has found the following procedure to secure a correct occlusion: After a full upper and lower set has been constructed in the usual manner and thoroughly finished, the plates should be placed in the patient's mouth, well in position; then place between the teeth on each side from the cuspids back to the last molar a small portion of wax about an eighth of an inch thick, and direct the patient to close the teeth firmly until the first points of contact

are obtained, after which the full denture should be removed from the mouth and placed in an accurate articulator with plaster. When the plaster sets, open the articulator and remove the wax, when all imperfections of occlusion will be indicated, and readily corrected by the use of corundum-wheels on the engine.

Dr. Beville has practiced the method for many years, and it is the best he has ever tried.

Dr. Beach. That method was recommended by Dr. A. B. Abell in 1872, and the speaker was truly glad that Dr. Crawford had brought it to mind. The position has been taken that sore mouth is caused by badly-fitting plates. You will find sore mouths in certain temperaments, no matter what the plates are made of. Some persons could not wear a gold plate if their lives depended on it. How many are there who cannot take quinia without exhibiting the effect usually produced by morphia. Twelve grains of quinia would be death to such a one. We must have some judgment as to what will be the effect of a particular substance, and we can only find out by trying. There are some persons wearing rubber plates who could not wear gold; others are exactly the opposite. There are few things of which a better adaptation can be made than rubber; but the principles underlying its use are not properly understood. There is a slight shrinkage which must be allowed for. To do this either the model or the impression must be manipulated. He wished to emphasize what Dr. Crawford said about taking the bite. But Dr. Crawford does more than he stated. On articulating the teeth he takes a little shoe-blackening and puts it on one side, so that when the teeth are closed they will show for themselves just where they should be eased off.

Dr. McKellops. The depots supply a paper for the same purpose.

Dr. J. L. Fountain, Bryan, Texas, suggested that, to prevent the plaster from sticking to the roof of the mouth in taking impressions, a hole made in the tray through which to pass up the point of a chip-blower would supply a ready means. A single puff with the blower would let it drop.

Dr. Crawford wanted to go on record as in favor of modelling composition for taking impressions.

The subject was passed.

On motion of Dr. Holland, the thanks of the association were tendered to the local committee of Galveston and to the State Association.

Dr. A. P. Johnston, Anderson, S. C., read the report of the operations performed at the clinic, as follows:

Dr. J. H. Grant, Palestine, Texas, contour gold filling, upper left central incisor, using Williams's cylinders and hand-mallet; Dr. E.

D. Andruss, Dallas, Texas, set a Logan crown with a gold collar, a left upper cuspid; Dr. W. W. Brooks, Memphis, Tenn., contour gold filling with Byrnes's mallet; Dr. C. S. Phillips, Corpus Christi, Texas, demonstrated his mouth-prop, rubber-dam depressor, and reflector; Dr. J. E. Breeding, San Antonio, Texas, gold filling for boy fourteen years of age, using cylinders of soft foil; Dr. O. B. Love, El Paso, Texas, set a gold crown upon a lower lateral incisor, including the preparation of the root; Dr. A. E. Brown, El Paso, Texas, inserted a large non-cohesive gold filling in a lower molar; Dr. C. B. Johnston, Monroe, La., gold filling with Byrnes's mallet; Dr. Geo. J. Friedrichs, New Orleans, La., gold filling with cylinders made by himself, using Abbey's non-cohesive foil and hand-pressure; Dr. B. Holly Smith, Jr., Baltimore, Md., extracted several teeth, using a local anesthetic administered by Dr. Beach, which was satisfactory in this case; Dr. M. C. Marshall, Little Rock, Ark., demonstrated the use of the Perry separators, and filled a tooth with gold, using the hand-mallet; Dr. T. M. Wyatt, Russellville, Ark., gold filling with Abbott mallet; Dr. N. T. Shields, Galveston, Texas, gold filling with electro-magnetic mallet.

The Committee on Education was called, and Dr. T. H. Lipscomb, Galveston, Texas, read a paper on "Dental Education and Literature," in which he sketched at some length the origin of modern dentistry from the foundation of the first college in 1839 and the establishment of the first journal in 1841, to the combined influence of which,—education and literature,—with the assistance of dental societies, its present position is due. He questioned if the examinations in the colleges were severe enough, though there seems to be a spirit of progress and a desire to improve, and some of the leading colleges are discussing the advisability of lengthening the term from five to nine months or the course from two to three years. [Since the foregoing was written the National Association of Dental Faculties has agreed to lengthen the course to three full terms of five months, beginning in 1891.] While there is room for criticism in the colleges, their influence or the good they have done are not to be underrated. They are all prepared to give the student the foundation on which to acquire the knowledge for a successful professional career, but many of the students look upon their diploma as the end of their student days, instead of the entrance into their course.

The literature of the profession is such that all may be proud of it. The paper then referred briefly to the more prominent works on professional subjects. Of the journals we should be especially proud. The man who carefully reads a few of the best can never be a quack. They keep us abreast of the rapid progress of the



profession, much of which is due to them. In this particular he referred especially to the paper of Dr. Meriam in the June DENTAL COSMOS, in which he places the standard far in advance of what it has ever been. So important is this paper that the agents of the Dental Trade Association have gone to the trouble and expense of having several hundred copies of a paper by Dr. Patrick in answer to it published and placed where they will fall into the hands of all present at the meeting of the Southern Dental Association. Societies have done much to educate the profession by bringing its members together, promoting investigation, and disseminating knowledge, and it would be well for all to be members of some association; but if they are, let them work.

Adjourned till 2 o'clock P.M.

*Afternoon Session.*

The association met pursuant to adjournment, President Crawford in the chair.

The subject of Education was resumed.

Dr. B. Holly Smith, Jr., Baltimore, Md., challenged the statement in Dr. Lipscomb's paper that the examinations in the colleges were superficial. During the last three years the Baltimore College of Dental Surgery had not accepted students who could not pass the examination required by the Association of Faculties. With reference to the statement in the paper that the copies of Dr. Patrick's paper were distributed by the agents of the Dental Trade Association, he did not believe that anyone would credit Dr. McKellops with being connected with that association. The speaker is on record as being opposed to patents for dental appliances. He is in sympathy with much of what Dr. Meriam says, but he does not believe in such radical measures as he advocates. Let us not cut off discussion by abuse.

Dr. Crawford thanked Dr. Lipscomb for the paper, but he would say that there were two rejections for incompetency at one session of the college with which he was formerly connected. These cases have to be handled carefully. It is a serious thing to reject a man after he has been in attendance on lectures, and it is even more so when the responsibility falls on one or two members of the faculty. In his school cases of this character were referred to a committee of three who were appointed for the purpose of affording relief to the dean. It would be a good thing if all the collegiate institutions had a committee of this character. In the case of one applicant for matriculation, for instance, the candidate was unable to solve so simple a problem as finding the interest of five hundred dollars at five per cent. for one year and a half. Rejections are not apt to be

heard of except by the faculties and the members of the classes with those who are rejected. The dental schools have led all others in advanced requirements. They have done what was not politic, but they have gone on the safe side. The Association of Faculties has decided that after the session of 1891-92 the schools connected with it shall require attendance on three full terms of not less than five months each before graduation.

Dr. Andruss gave the paper, in the main, his most hearty support. The dental profession has been progressive from the earliest day till now. The medical profession cannot begin to show progress with that of dentistry. Most of the progress of dentistry has been achieved through the work of the dentists of this country, and there is not a foreign court but has paid homage to American dentistry by employing it.

Dr. Thackston. What Dr. Andruss says is true. Until the American diploma in dentistry was debauched, its possession was a password to success in every part of Europe. For two or three decades Americans had the court practice in France, Germany, and Russia.

Dr. Andruss. We ought to be proud of American dentistry. He takes only one exception with regard to the method of education in the colleges, and that is the time limitation, requiring every applicant to attend a certain period before he can be graduated. Any person who pays the fees and can pass the examinations fully abreast of the requirements ought to be entitled to a diploma the same as if he had been born and reared in the college. If a man has knowledge, he ought to have credit for it.

Dr. McKellops. The profession should hold the schools responsible for the class of graduates turned out by them. The time is now ripe to look after some things in educational matters. He knows of one school in which the professor of chemistry did not examine the dental students in his branch, because chemistry was of so little use to them that it was not considered necessary. The father of American dentistry in Europe is Brewster, of Paris. But there is no country in the world outside of our own where the dentist has any show whatever. In other lands he cannot get social recognition, nor can he get into the gentlemen's clubs, any more than a barber. Go into the barber-shops in Europe and you will find such signs as "First-class dentists employed here," and these men go around from house to house soliciting work. One word in regard to advertisements. He has been looking into such things for a good while, and he keeps a scrap-book, the contents of which if published would make a good many cheeks burn. He has also been collecting dental books, and he would be glad to get any such not now in his collection. He has a rival in the library of the surgeon-general's office at Wash-

ington, but he leads the Odontological Society of Great Britain by three hundred volumes.

Dr. M. C. Marshall, Little Rock, Ark., stated that a young man came to his city and located there, who was a graduate of a college recognized by the Association of Faculties, who could neither speak nor write a correct English sentence.

Dr. Lipscomb, in closing the discussion, said that a majority of the graduates of colleges with whom he had conversed said that they had not been made to undergo a preliminary examination. He himself had not been, and he thought not anyone in his class was.

The subject was passed.

Dr. McKellops moved an appropriation of fifty dollars to assist in the work of tabulating pre-historic skulls, but afterward withdrew the motion.

Dr. H. J. McBride, Tyler, Texas, offered an amendment to the constitution fixing the annual dues at three dollars; non-payment for two successive years to work a suspension of the member, whose name should be dropped from the rolls after failure to pay his dues for three years. Laid over for one year.

The Executive Committee reported that they had audited and found correct the treasurer's account; and that the balance on hand had been remitted to them by the treasurer, Dr. H. A. Lowrance, of Athens, Ga., who had been unable to attend the meeting. The report was received, and the various bills presented were ordered paid. The association then proceeded to the selection of the next place of meeting and the election of officers for the ensuing year, the result of which has been already reported.

Dr. Thackston then, at the invitation of President Crawford, took the chair, and inducted the newly-elected officers as they were presented to him by the retiring president.

Dr. Storey, the new president, then assumed the chair, and Dr. Thackston moved the thanks of the association to the dentists and citizens of Galveston, to the mayor and authorities of the city, and to the hotels and railroads. Carried.

Adjourned to meet at Atlanta the third Tuesday in July, 1890.

#### PENNSYLVANIA ASSOCIATION OF DENTAL SURGEONS.

At the annual meeting of the Pennsylvania Association of Dental Surgeons the following were elected officers to serve for the ensuing year: Howard E. Roberts, president; C. F. Bonsall, vice-president; Theodore F. Chupein, recording and corresponding secretary and reporter, and W. H. Trueman, treasurer and librarian.

THEODORE F. CHUPEIN, *Secretary*.



### FIRST DISTRICT DENTAL SOCIETY CLINICS.

THE clinics conducted by the First District Dental Society of the State of New York will be held on the second Tuesday of the month, from two to five o'clock P.M., beginning October 8, 1889, continuing monthly to and including June 10, 1890.

The committee invite persons having new or improved appliances to exhibit, and members of the profession desiring to give a clinic before the society, to communicate with the chairman of the Clinic Committee, Dr. V. H. Jackson, No. 6 East One Hundred and Twenty-sixth street, New York City.

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### ANNIVERSARY MEETING OF THE FIRST DISTRICT DENTAL SOCIETY OF NEW YORK.

THE First District Dental Society of the State of New York will hold its twenty-first anniversary in New York City, January 14, 15, and 16, 1890, on which occasion every practicing dentist will be cordially invited. Special railroad and hotel rates will be made. Please note date of meeting, and make your appointments accordingly.

All communications should be addressed

W. W. WALKER, *Chairman of the Executive Committee,*  
67 West Ninth street, New York City.

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### EDITORIAL.

#### THE "HEAVENLY SPIRIT" AND THE "EVIL NATURE."

WE publish in this issue, in the report of the recent session of the American Dental Association, a paper read before that body entitled "The Necessity for Independent Dental Journalism," by Dr. Louis Jack, of this city.

The paper in question it is fair to assume was deliberately prepared for presentation to the highest representative body of the profession in this country. The author has had, moreover, the usual opportunity, of which he availed himself, to revise proof. Its utterances are therefore not to be palliated as if they had occurred in the course of extemporaneous discussion or in a casual presentation of the subject. Complaint of its critical examination is consequently debarred.

The speaker's conception of the functions of the public press and

the relations which dental journalism should bear to dentistry served the purpose of an introduction to a general indictment of all dental journals published by commercial houses; but as Dr. Jack appeared in the dual capacity of a member of the association and also as a stockholder and president of the International Dental Publication Company, it may be assumed that he was consciously or unconsciously "biased" by his "business interests," for, as he himself said, "in the very nature of the constitution of the human faculties it could not be otherwise." Indeed, we have not for a long time seen such marked evidence of "bias" as is exhibited in the paper in question. A few extracts will illustrate this position:

"They" [the journals alluded to] "have failed to discuss editorially the questions concerning us, as they have arisen, without the bias of their business interests."

"Independent opinion could not be stated, for the fear of its influence upon their business."

"These journals have USURPED the function of supplying the dental profession with liberal and pertinent thoughts," etc.

"They have STIFLED in some cases the full expression upon questions which were by some construction of theirs not favorable to their interests."

They "have not hesitated to use those who have sold the birthright of honorable manhood to inculcate sentiments averse to high professional views and have tried thereby to create false ideas."

"They have used their influence and the power of their agents to check the efforts of dentists to organize for the purpose of defending themselves from the exactions of those who have under their encouragement grown into dangerous opponents to our professional interests."

Dr. Jack claims that business men

"have proven by their conduct and have declared by their words that the ethics of business and the ethics of professional life are different,"

and proceeds to define the difference as follows:

"The essential spirit of professional ethics is such a consideration for the interests of others as to lead one to prefer the good of another to his own benefit."

This he pronounces a "HEAVENLY SPIRIT."

"The general tendency of trade is to secure the good of the individual to the disadvantage or the injury of others."

This he denominates an "EVIL NATURE," and says,—

"They who are guided by this principle of action are morally unfit to lead the opinions of others, for the reason that as their actions spring from bad principles they fail to be in the light of truth."

The lugubrious deduction of the author of the paper is,—

"The most liberal views of our relations to each other are in a state of decay, and there is consequent deficiency of *esprit de corps*."

These accusations would have greater force if made specific as to the parties alluded to, and we think Dr. Jack should, "in regard for professional good, in view of which the individual is as nothing," assume the duty, however distasteful, of naming those bold bad men who have "usurped," "stifled," "tried to create false ideas," "checked the efforts of dentists to organize," shown an "evil nature," "encouraged dangerous opponents to professional interests," and in general proved themselves "morally unfit to lead the opinions of others."

Webster defines usurpation as—

"The act of usurping, or of seizing, or occupying and enjoying, the power or property of another without right; an unauthorized, arbitrary assumption and exercise of power, especially as infringing on the rights of others."

It would be interesting to know who usurped the rights of others, and whose rights were usurped. Did Dr. Jack employ this word in ignorance of its meaning, or have the dentists of the world been compelled to submit to an arbitrary assumption and exercise of power? Have they been compelled to subscribe and pay for a periodical literature which they neither needed nor desired?

Whether the company publisher of the DENTAL COSMOS and its editor, notwithstanding his possession of the dental and medical degrees, are included in the general condemnation or not is open to conjecture: the deponent sayeth not. It is, however, a reasonable inference that the essayist did not intend to make exception. He came before the American Dental Association for a specific object,—the advancement of the interests which he represented. But in this legitimate, even laudable object he failed to preserve the "heavenly" professional spirit and yielded to the "evil nature" which characterizes those who are engaged in trade. He forgot the charity which thinketh no evil, and, not content with discussing methods, a topic full of interest to the profession and the trade alike, impugned the motives of those whom he criticised and made unjustifiable and demoralizing statements concerning the "general tendency" of the occupations of more than one-half of civilized humanity.

The opportunity was a favorable one to show specific grounds of complaint instead of dealing in vague generalities. What were or are "the questions which have not been discussed"? What were or are "the living issues of the time" which have not been presented? What were or are the questions upon which expression has been "stifled"? Who were they who sold their "birthright of honorable manhood," and who "used" such persons? Who was it that "inculcated sentiments averse to high professional views"? Who was it that "tried to create false ideas"? Who were they who "used



their influence and the power of their agents to check the efforts of dentists to organize"? Who are they who are giving "encouragement to dangerous opponents to our professional interests"? Does Dr. Jack mean to intimate that Drs. Taft, Gorgas, Watt, Harlan, Patterson, and other professional men who edit journals published by commercial houses temper the conduct of their respective journals in the business interests of the publishers? If not, what does he mean?

The charges should be made specific as to subjects and to men. Representing both the publishing and editorial departments of a dental journal, we are interested, and cheerfully tender the pages of the DENTAL COSMOS to Dr. Jack, and hope he will avail himself of the opportunity to justify the utterances quoted. It ought to be possible for a professional man possessed of a heavenly spirit to advocate a scheme in which he is interested without indulging in detraction not susceptible of justification.

As to the more general positions assumed in the paper, we have to say that in our opinion it is not wise nor just to create the impression that the so-called "heavenly spirit" is confined to the professions, and that outside of them the "evil nature" is in the ascendant. The idea that those engaged in trade qualify all duty into expediency, that they have no proper conception of the abstract right, that they are destitute of principle, avaricious, grasping,—in short, governed by an "evil nature,"—is not to be adopted except at the peril of civilization.

On the other hand, to imbue "the minds of the student and the younger men" with the notion that "the pabulum out of which professional character is formed" consists in exaggerated ideas of either moral or intellectual superiority by reason of their profession or in any decision concerning "politic questions as they arise," is likewise as mischievous as it is false.

Dr. Jack makes a point of the admission by business men that "the ethics of business and the ethics of professional life are different." Of course they are. The same rules which are applicable to one pursuit are not adapted to all. The ethics of ministers, lawyers, doctors, dentists, editors, and merchants differ of necessity, but all, if worthy of respect, are founded on the golden rule. The difference is not in the essential characteristics of the written or unwritten codes, but in the adaptation of foundation principles to the nature of the respective vocations; and the standard of personal honor is, we think, no whit higher among reputable professional men of any class than among reputable business men.

Moreover, it is to be remembered that the management of a dental journal is a business matter; requires business methods, business

energy, and involves business risks. The gentlemen composing the International Dental Publication Company, represented by Dr. Jack, whether engaged in professional pursuits or not, became business men by their association as a publishing company. Will they be the exception to prove the general rule? Are they deeply enough imbued with the "heavenly spirit" to carry its leaven into the publication business, or will they succumb to the "evil nature" which, "in the very nature of the sensitiveness of trade and the constitution of the human faculties" characterizes the general tendency of trade? Will they be able to conduct their journal without personal solicitation of subscriptions and advertisements? May they not have to offer special inducements for advertising patronage, premiums to attract subscribers, and do other acts which will inevitably manifest an "evil nature"? As a matter of fact, did not the "evil nature" crop out slightly in the paper under discussion?

Dr. Jack says, summarizing, "We should be free if we would be self-respecting, and if we would have the enlarging confidence of the parent schools of medicine and the abiding esteem of the public."

We beg leave to add that something more than the freedom to which he alludes is necessary in order to obtain the desirable results named. No refinement of ethics, no assumption of superiority in morals, no claims for superior "clearness of intellect" based on titles will gain the distinction to which "the student and the younger men" should aspire. Such distinction must rest on the solid foundation of moral character, and of unquestioned and unquestionable fitness for the responsibilities devolving upon the holder of a diploma which gives him the title of doctor. The "pabulum out of which professional character is formed" is professional qualification. There is nothing which steadies a ship so well as plenty of ballast, and too great spread of sail with light ballast is hazardous. The danger not alone to "the student and the younger men" is in too much "professional spirit," too little professional foundation.

Referring to Dr. Jack's queries as to medical journalism, we have to say that with rare exceptions medical journals are published by commercial houses, and the object of their publication is to make money; but the question is not, Whence does the literature of a profession emanate? but, What is its character? and whoever succeeds in the effort of furnishing the best periodical literature is entitled to the godspeed of the profession. The DENTAL COSMOS is content to stake its appreciation and its support on that basis and on that alone. It may not possess "the clearness of intellect to do any of those things which go to form the pabulum of professional life," but it has had the necessary clearness of intellect to achieve success without bearing false witness.

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ORTHODONTIA, OR MALPOSITION OF THE HUMAN TEETH; ITS PREVENTION AND REMEDY. By S. H. GUILFORD, A.M., D.D.S., Ph.D. Octavo, pp.186. Philadelphia, press of Spangler & Davis, 1889. Price, \$1.75.

The author has given to the profession in this work a presentation of the subject which is sufficiently comprehensive in its scope to cover all ordinary demands that could properly be made. The work is divided into—Part I, which treats of the “Principles Involved,” including etiology, evils associated with irregularity, age at which correction may be begun, principles governing the application of force, extraction as related to orthodontia, physiology of tooth-movement, etc.; Part II, in which are considered “Materials and Methods”; and Part III, which is devoted to “Specific Forms of Irregularity and their Treatment.”

A careful examination of the book impresses the reader with the marked spirit of conservatism which the author has exhibited in dealing with his subject, begetting as it does a feeling of confidence in the utility of such methods as he recommends which are as yet unfamiliar to the reader.

The discussion of principles is clear and logical, and fully in accord with the present state of our knowledge of the subject.

The illustrative cases are typical and sufficiently numerous to meet the requirements of any practitioner of average ability and ingenuity, and are so far suggestive as will enable him to adapt the methods given to such special cases as from time to time arise in practice.

As a text-book for students, for which it is especially designed, its clearness of expression together with its logical method of presenting the subject are particularly commendable, and must place it far in advance of anything of a similar character and purpose heretofore written. The work does not aim to be exhaustive in scope, and, while sufficiently full, in no department are the teaching qualities of the book overburdened or obscured by any excess of subject-matter. Taken as a whole, it is evidently the work of a teacher not only familiar with his subject, but of the needs of the student in this particular department of dental practice. E. C. K.

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## OBITUARY.

### DR. HORACE H. YOUNG.

DIED, at South Williamstown, Mass., September 1, 1889, HORACE H. YOUNG, M.D., D.D.S., in the eighty-first year of his age.

Dr. Young was born in South Williamstown, Mass., December 8, 1808, and spent his early life working on his father's farm. At



twenty years of age he went to Troy, N. Y., and began the study of medicine, attending lectures at the Medical College in Pittsfield, Mass., from which he received his degree in 1833. After practicing medicine a short time he turned his attention to dentistry, and became a skilled practitioner. Dr. Young contributed to the dental literature of the day; and in recognition of his contribution and of specimens of work sent to the Baltimore College of Dental Surgery, that institution conferred on him the honorary degree of D.D.S. in the year 1847.

Dr. Young was one of the first to advocate the organizing of a dental society in that part of the State. The Hudson Valley Dental Society was formed and the constitution adopted in 1864, and Dr. Young was chosen president, holding that office for several years. He was a member of the New York State Dental Society. Dr. Young retired from practice in 1881, on account of his age, after a practice of forty-six years. He leaves seven adult children, one of whom, G. B. Young, is practicing dentistry at Troy, N. Y.

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## HINTS AND QUERIES.

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**AN EVERTED CROWN.**—September, 1889, I extracted, without fracture, the tooth represented in the accompanying Fig. 1. The specimen is, as far as I know, unique, or at least sufficiently remarkable to deserve permanent record. Fig. 2 shows the tooth in position before I clipped the fold of mucous membrane overlying it. Fig. 3 indicates the general situation, a flap attached to the gum covering a portion of the lingual surface of the tooth. The crown,

FIG. 1.



FIG. 2.

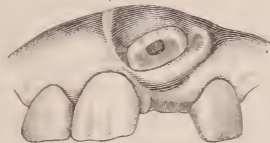
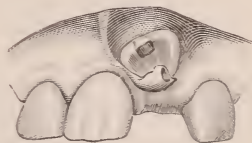


FIG. 3.



pointing outward, projected into the lip, causing irritation which rendered it proper to remove the tooth.

The history of the patient, family and personal, as given by the physician who accompanied him to my office, is this: "Grandparents on mother's side both had regular teeth which presented no anomaly, but became carious at an early age. Paternal grandparents had regular teeth which remained sound to an advanced age. Mother's teeth present no peculiarity; neither the father's, which are even and sound. The closest investigation fails to reveal any history of rachitis, stroma, or syphilis. The deciduous teeth of the patient were erupted at the usual time and in the usual order, except that the central incisors in the upper jaw pre-

ceded those in the lower jaw. There is no history of any peculiarity in their form, size, or position. When less than seven years old, the patient fell upon the sidewalk and received a blow which loosened a central incisor in the upper jaw. This tooth was subsequently extracted. The incisor of the permanent set did not appear at the usual time. When about fifteen years old, the patient was examined by a dentist, who stated that there was a perfectly formed tooth in the jaw which he believed would grow and fill its regular position. A few months after this the patient noticed a tooth making its way through the gum about an eighth or a quarter of an inch above its normal position. From that time until now—the patient is in his twentieth year—the tooth has continued to grow, causing no inconvenience beyond a protrusion of the upper lip which was easily noticeable. Neither he nor his parents noticed anything indicating the state of affairs as revealed by Dr. Grady."

The literature of the profession probably records similar cases, but the writer is not familiar with any examples except the one given by Dr. Guilford in "The American System of Dentistry," "history not ascertained"; and the specimen of an incisor tooth shown in Salter's "Dental Pathology and Surgery," about which he says, "Sudden mechanical violence may shift a partially formed tooth from the soft, immature pulp upon which it was growing, and this without preventing the continuation of development."

J. Tomes speaks of this eversion as "dilaceration of partially developed teeth from the formative pulp"; but Wedl explains it by saying that it is due to "continued pressure of a tooth already cut upon one whose development is interrupted or whose eruption is retarded."

Between the explanations of these professional authors the writer does not presume to decide. He merely desires to have it observed—

1. That the crown and the root form a right-angle.
2. That the root has grown its natural length, proving that calcification went on after the accident.
3. That the serrations are distinctly marked on the cutting-edge of the crown.
4. That the crown of the extracted tooth is smaller than the adjoining central incisor.
5. That the divergence of the crown is such that the whole *lingual* surface is seen.—RICHARD GRADY, M.D., D.D.S., Baltimore.

**ILLEGAL DENTAL PRACTICE.**—In the October DENTAL COSMOS "M. D." asks "if there has been a case in which a graduate in medicine has been prosecuted for practicing dentistry?" In 1888, under the Oregon dental law, an M.D. who claimed to be a graduate of a Missouri medical college was arrested for the unlawful practice of dentistry. He waived examination, gave bonds to appear before the grand jury, and in November came before that legal body, which by a bare majority declined to find a true bill, and the M.D. departed for Washington Territory.—J. W. T.

**IODOFORM ODOR NEUTRALIZED.**—One or two drops of creasote or carbolic acid to the ounce of iodoform will effectually deodorize it without the least injury to its remedial properties, which I hold in high esteem notwithstanding the many reports of its inertness.—L. M. HALSEY, D.D.S., Brooklyn, N. Y.

# A MONTHLY BIBLIOGRAPHY OF DENTAL LITERATURE.

COMPILED BY J. MELVIN LAMB, M.D., WASHINGTON, D. C.

THIS bibliography will be continued monthly in the DENTAL COSMOS, and will furnish as complete a record of dental literature as can be gleaned from current periodicals and transactions of societies.

The abbreviations of titles used are those common to bibliographical work, and will, it is presumed, be readily comprehended by any one familiar with dental or scientific publications. Any explanation will be gladly furnished by the compiler.

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# THE DENTAL COSMOS.

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No. 12.

## ORIGINAL COMMUNICATIONS.

### ON THE ANTISEPTIC ACTION OF FILLING-MATERIALS.

BY W. D. MILLER, PH.D., D.D.S., BERLIN.

It will scarcely be questioned by anyone acquainted with the nature of those diseases of the teeth which we treat by filling, that in a great many cases, if not in all, the probability of success would be greatly heightened if the filling-material could be made to exert a permanent antiseptic action upon the walls and margin of the cavity. This is more particularly true of all cases where, for some reason or other, carious dentine is left in the cavity at the time of filling; and such cases constantly occur in every dental practice. There are, I hope, very few practitioners in dentistry who place so high an estimate upon their own skill and thoroughness, or so far overlook the imperfection in the structure of the dentine, as to imagine that they excavate every cavity perfectly. Many even *prefer* leaving a thin layer of softened dentine in the cavity to removing it, if the pulp would thereby be exposed. Others, no doubt, for very humane reasons, sometimes excavate less thoroughly than they otherwise would do, in order to spare their patient the excessive pain accompanying the operation, or because the patient cannot or will not bear the pain. Most of us, for the sake of our backs, toward the end of a hard day's work, now and then decide that a difficult cavity is ready to fill when a careful examination of it might still reveal soft points. It is not necessary, however, to enumerate other cases in which the preparation of the cavity is not quite faultless; most readers will no doubt be able to suggest many more.

Now, it may appear remarkable that, while so much attention has of late years been bestowed upon the antiseptic treatment of root-

canals and the employment of antiseptic materials for filling them, very little attention has been given to the subject of the antiseptic materials for filling cavities of decay; iodoform cement being, as far as I know, the only material which was introduced with this object in view. That it does not accomplish its object will, I think, be apparent from the experiments recorded below.

#### METHODS.—I.

Various methods may be employed for determining the antiseptic action of filling-materials. The two which I have made use of are exceedingly simple, and at the same time very instructive. In applying the first of these methods we proceed as follows: A tube of ordinary nutritive gelatine is infected with a bacterium from the oral cavity, which grows rapidly at room temperature without liquefying the gelatine. The gelatine is then melted, slightly shaken, so as to distribute the fungi equally throughout the solution, and poured upon a horizontal sterilized glass plate, upon which we drop pieces of the filling-material or other substances whose antiseptic action we wish to determine. As soon as the gelatine becomes stiff we place the plate in a damp chamber. A plate prepared in this way, without the addition of any material having an antiseptic action, will become cloudy and opaque in the course of twenty-four to forty-eight hours, through the development of innumerable colonies of bacteria. If, however, the pieces of filling-materials which we have dropped upon the plate possess an antiseptic action, the development of the fungi in their neighborhood will be retarded or altogether prevented, and each piece will appear surrounded by an area of transparent gelatine whose size will depend upon the activity of the antiseptic employed. Most of the filling-materials in use were tested by this method in respect to the antiseptic action, with the result that the only one which possesses such action and retains it for an indefinite time after it has been inserted is copper amalgam.\* Not only freshly-mixed fillings, but pieces of old, half-worn-out fillings, taken from teeth extracted in the polyclinic of the Dental Institute, and even pieces of *dentine* from teeth which had been filled with copper amalgam, invariably manifested a retarding or preventing action upon the growth of bacteria. (Fig. 1.)

These results accord exactly with those which I obtained by

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\* Regarding an unexpected antiseptic action of certain preparations of gold which might appear to furnish an exception to this rule, see the experiments described below.

entirely other methods in 1884 (*Independent Practitioner*, June), and which have been called in question by Bogue and others.

Of course it must not be inferred from these remarks that a little piece of copper amalgam dropped into a litre of bouillon will keep it from spoiling. Nor would an experiment of this nature be a just test of the antiseptic action of a material used in filling.

If the filling prevents the progress of decay in softened dentine under it or in immediate contact with it, and if it retards the progress of fermentation in fine spaces (leakages) between it and the marginal wall, then it is doing a great deal toward preventing the recurrence of caries, which another filling not possessing antiseptic properties would not do.

That so much is accomplished by copper amalgam, I am, I believe, justified in concluding from the experiments enumerated above, and

FIG. 1.



An inoculated gelatine plate containing : *a*, pieces of oxyphosphate cement one day old ; *b*, pieces of gold amalgam one day old ; *c*, pieces of an old copper amalgam filling, age unknown ; *d*, pieces of stained dentine from a tooth which had been filled many years previously with copper amalgam.

more particularly from those made under the second method and described below. It is a view, moreover, pretty generally accepted by all operators who have had opportunity of observing the action of copper amalgam fillings, that they do possess a preserving action upon tooth-substance. I, along with most others, formerly accounted for this action upon the supposition that copper amalgam does not shrink while setting. I meet almost daily with amalgam fillings, not containing copper, which admit of the point of an excavator being inserted between the filling and the margin of the cavity, whereas copper amalgam fillings appear to hug the walls of the cavity perfectly. Elliott,\* however, found by a very extended

\* Transactions of the Odontological Society of Great Britain, December, 1888.



series of experiments that copper amalgams do contract, and some of them to a surprising degree. Elliott's results are corroborated by the evidence of J. Boyd Wallis,\* who claims that the slight contraction is a distinct advantage in the case of soft and sensitive teeth, because of the more speedy formation of the oxide or sulphide, which, being absorbed by the surrounding dentine, protects it from further progress of decay. "Pulps dying under copper amalgam fillings do not so readily decompose, owing to their becoming charged with antiseptic cupric salts."

Other materials experimented with by the first method were gold amalgam, oxychloride of zinc (agate cement), oxyphosphate of zinc (Caulk's cement), gutta-percha, gold, tin, and tin-gold.

FIG 2.



An inoculated gelatine plate containing pieces of freshly-mixed cement. *a*, oxychloride; *b*, oxyphosphate. A very marked hindrance in the development of the fungi is noted around the pieces of oxychloride; around the pieces of oxyphosphate it is scarcely perceptible. Plate twenty-four hours old.

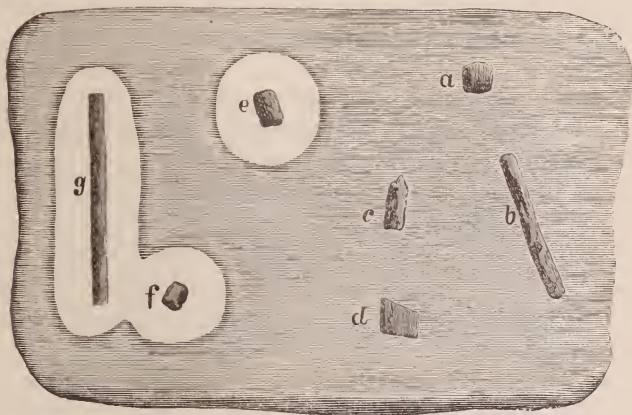
Gold amalgam, freshly mixed, caused a slight retardation in the development of fungi; old pieces had no effect. Oxychloride of zinc, fresh, had a very marked action (see Fig. 2). Pieces which had lain twenty-four hours in saliva and bread lost their antiseptic power. Oxyphosphate of zinc, fresh, had a slight, inconstant action (Fig. 2), sometimes none at all. After twenty-four hours' exposure in a mixture of saliva and bread, it showed no action whatever; gutta-percha and tin proved completely inactive.

The results obtained with gold were very peculiar and perplexing. Some preparations of gold manifest a decided restraining effect upon the development of bacteria, so that if a pellet is dropped upon

\* *Dental Record*, February, 1889.

the plate it will after twenty-four to forty-eight hours appear surrounded by a perfectly round circle of transparent gelatine, separated from the clouded gelatine by a sharp border. Within this zone the fungi develop very slowly, so that the cloudiness appears much later than on other parts of the plate. The antiseptic action of Pack's pellets was particularly marked. Plugs of the unannealed pellets made in holes bored in wood showed considerable action, even after they had lain for forty-eight to seventy-two hours in a mixture of saliva and bread. Also Abbey's soft foil and quarter-century foil showed similar action, but in a somewhat less degree. Other preparations showed varied effects; some had almost or quite none at all. *This action was completely destroyed by annealing the gold beforehand* (Fig. 3). Some preparations of sponge gold and

FIG. 3.



Inoculated gelatine plate containing Pack's pellets and Abbey's foil No. 4, folded to make strips of No 32. *a, b, c, d, annealed; e, f, g, unannealed.* The latter have retarded the growth of the fungi in their neighborhood, as is shown by the gelatine remaining clear. Plate twenty-four hours old.

platinum gold acted in a similar manner, and even old gold fillings now and then showed considerable antiseptic action.

I shall not attempt to give any explanation for these facts now. Different explanations suggest themselves, none, however, with which I have been quite satisfied. Nor will I at present endeavor to answer the question whether the action is strong enough to be entitled to any consideration as a saving property of unannealed gold. I am inclined to think that it would be rather venturesome to assert that it is.

Tin-gold was less active than gold alone.

I applied this method of testing the antiseptic property of filling-materials to a few other substances; among them to iodoform, which

did not have the slightest action in checking the growth of the fungi.

## II.

In order to make a direct test of the action of fillings upon carious dentine or upon the micro-organisms contained in it, we proceed as follows: A number of freshly-extracted teeth which are extensively decayed, not, however, so as to expose the pulp, are cleansed of the remains of food, and only partially excavated, so as to leave a thick layer of carious dentine in each cavity.

The cavities are then filled with various substances whose antiseptic action we wish to test, and the teeth placed in a mixture of saliva and bread and kept for three days at a temperature of 30° C. to 40° C. At the end of this time they are taken out, washed in pure water, placed for a moment in sublimate 1-1000, then in a larger quantity of sterilized water to remove the sublimate, after which they are dried with sterilized bibulous paper. We then take the teeth by the root or roots, rest the side of the crown upon a small anvil, and strike a sharp blow upon it with a hammer. The filling flies out, exposing the untouched surface of carious dentine. We now with a sterilized spoon-shaped excavator remove a small piece of the carious dentine and place it upon a previously prepared plate of sterile nutritive agar-agar. The plate is then put away in a moist chamber at or near the temperature of the human body. If now the fungi in the carious dentine have been killed by the action of the filling-material, or if the dentine has been so acted upon by the material as itself to become antiseptic, no fungi will develop around it; otherwise we will find in the course of forty-eight to sixty hours that the piece of dentine becomes surrounded by a zone of fungous growth of varying extent.

In examining the plates, a low power of the microscope should be used in cases where a growth is not visible to the naked eye. Furthermore, a slight cloudiness or precipitate which sometimes forms around pieces impregnated with copper salts must not be mistaken for a fungous growth; and lastly, a development of bud-fungi (yeast-fungi, *Saccharomycetes*), or mold-fungi (*Hyphomycetes*), which is very frequently observed, must not be mistaken for fission-fungi (*Schizomycetes*).

The following materials were examined by this method:

1. Copper amalgam (Lippoldt's). Fifteen teeth were treated as described, and the carious dentine examined by culture. In not a single case did a development of bacteria take place. They had either been devitalized or the dentine itself had become antiseptic. In two cases, bud-fungi developed; in one case, mold-fungi.

2. Gold amalgam, ten teeth. In all cases a development of bacteria



took place around the dentine, to say nothing of bud- and mold-fungi (Fig. 4).

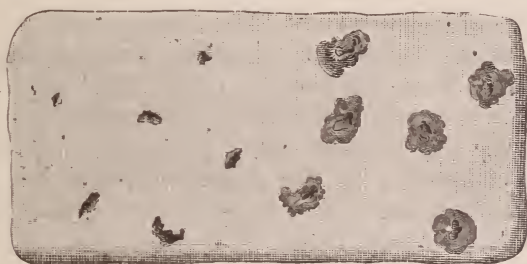
3. Oxyphosphate, eight teeth. Result same as with gold amalgam.

4. Oxychloride of zinc, eight teeth. In seven cases a growth of bacteria formed, though very much retarded when compared with the oxyphosphate or gold amalgam. In one case the piece remained sterile.

5. Iodoform powder mixed with phosphate cement, one tooth. Development of fungi unchecked. In another case the floor of the cavity was covered with powdered iodoform and oxyphosphate filled over. Pieces of dentine taken from the cavity after three days and transferred to the culture plate were soon surrounded by a growth of bacteria and bud-fungi.

6. Powdered sulphate of copper incorporated with cement or with gutta-percha, or simply strewn upon the bottom of the cavity

FIG. 4.



A sterile agar-agar plate, containing in the left half pieces of dentine from a cavity which had been filled with copper amalgam, in the right half pieces from a cavity which had been filled with gold amalgam. The former have remained sterile, whereas an extensive growth of fungi has taken place around the latter. Plate three days old.

before filling, nine teeth. No trace of bacterial growth appeared in any case.

From these results we are forced to the conclusion that copper amalgam fillings exert a marked antibacterial influence upon the walls of the cavities containing them, that oxychloride cements have an appreciable though markedly less effect, and that oxyphosphate and gold amalgam are wanting in any such action. We learn, furthermore, that by incorporating certain antiseptics into the mass of the filling or covering the bottom of the cavity before inserting the filling we may produce an effect analogous to that of copper amalgam.

Can any application of these results be made in practice? I think so, though I am certainly not in favor of being over-hasty in drawing conclusions.

Personally, I have always had much faith in the preservative properties of copper amalgam fillings, because I have had abundant opportunity to observe the splendid results obtained by its use even when very little care was taken in its insertion. The experiments which I have made have naturally served to strengthen my confidence in this material, in consequence of which I have used it to some extent in my practice in the last year. At the cervical margin I often put a layer of copper amalgam, and then fill the rest of the cavity with some other material. In cases of complicated caries extending under the gum and very near the pulp, where phosphate fillings are utterly unreliable, and even combined with gutta-percha often very unsatisfactory, and where it is not considered wise to risk a permanent filling at once, I protect the neck of the tooth by copper amalgam, allowing a very thin layer to extend over the floor of the cavity in order to thoroughly sterilize the dentine and keep it sterile. I then fill the remaining part of the cavity with cement or gutta-percha, with the intention, in case all goes well, of replacing it in some months by a permanent material.

Where, however, I am inclined to believe that the use of antiseptic materials may be accompanied by excellent results is for capping exposed pulps, particularly when they are not in a healthy condition, or contain germs of infection, as well as for covering the floor of the cavity in all cases where the pulp is protected by but a thin layer of dentine, which is very often more or less softened, if not infected with bacteria. For this purpose sulphate of copper, incorporated with gutta-percha or with some soft cement like oxysulphate, would, I am convinced, go far to effectually sterilize the thin layer of dentine covering the pulp, and thereby to prevent not only the decomposition of such softened dentine as may have been left over the pulp, but also the infection of the latter, which is very often the case of pulp-troubles arising under fillings.

The sulphate of copper, however, seriously stains dead teeth in the course of three days, and would probably act with equal rapidity upon living teeth, so that its use would be on that account very much restricted, if not altogether contraindicated.

Various substances suggest themselves, which, being incorporated with cement or gutta-percha, might do good service as antiseptic dressings over diseased pulps or over softened dentine; first of all, naturally, the bichloride of mercury. Which of the many available antiseptics, however, is best adapted to the purpose must be determined by further experiments in the laboratory and in practice.

The practice of treating exposed pulps, whether healthy or diseased, to a bath of concentrated carbolic acid has been sharply criticised by various writers. There are nevertheless many prac-

tioners in high standing who treat all exposures of the pulp in this manner, and claim to obtain better results than by any other method. I will not venture to say that this may not be so, because the ill effects of so severely cauterizing the pulp-tissue may be balanced by the good effects of thorough antiseptic treatment. If we, however, could attain the same object by the use of less irritating agents, our probability of success would be much greater.

Further experiments relating to this subject are now in progress, and will be reported in due time.

## DENTAL EDUCATION.

BY DR. G. S. DEAN, SAN FRANCISCO, CAL.

(Concluded from page 846.)

FROM the general we naturally pass to the detail. Here the questions are legion. It would be impossible to consider them all. At most, we could only do here what has been done in the presentation of preliminary principles—glance at primary matters, and omit everything explanatory or secondary. But I shall not do even this. I shall leave systematic examination at this point, and shall pass to consider the questions which are raised in the most prominent and most original paper on education which has appeared for years,—that presented by Prof. L. C. Ingersoll to the American and Southern Dental Associations, and published in the DENTAL COSMOS for March, 1889.

Indeed, what has preceded has been intended as a foundation for the proper criticism of Prof. Ingersoll's paper, or, more properly, of Prof. Ingersoll's views as expressed in his paper. I recognized at the outset that, in the discussion of educational as of other questions, mere opinion is of no value. I therefore felt it necessary to lay a basis for my criticism—a basis, if possible, of fundamental truth. I recognized, moreover, that, though valueless things sometimes pass as valuable, yet, if I should venture in any matter to express disagreement with a gentleman of Prof. Ingersoll's recognized ability, my dissent must, to be received, take more substantial form than mere opinion, and have more substantial support than superficial argument, especially as Dr. Ingersoll is an educator and I am a spectator of education; and few, even among professional men, have learned that the man who sees the battle is not the soldier, but the external observer.

My premises, then, being laid, I may proceed to consider the professor's paper. This is entitled "Methods in Dental College



Education," and, on examination, will be found to consist of a brief introduction, followed by a reference to the school as the principal factor in modern professional education, a presentation of the importance of proper methods of instruction, a statement of the methods of teaching now employed in dental schools, and a proposal of certain changes in these methods. The paper is written cursorily,—a mode of writing which produces brevity, but gains this at the expense of distinctness of consideration of the parts of the subject. It results that the doctor, not sectionizing his subject or classifying its parts, opens with remarks on intellectual education, proceeds to manual education, and then passes to intellectual education again. Emotional education is not overtly referred to, but is perhaps hinted at in some strictures on the integrity displayed in college announcements. With regard to intellectual instruction, which the doctor takes up first, there is proposed the substitution of the catechetic method and the text-book task method for the lecture method, and there is advocated the requisition of the memorizing of verbal rules and statements of principles. Passing to art-instruction, the doctor objects to the teaching of a variety of modes of operating during the college course; he would turn out men who know little in the way of dental art, but have been drilled in that little. Returning to intellectual education, he objects to the breadth of present teaching. I must add that "the class that fill our colleges" is, according to the doctor, a class widely different from that which has come into the profession in the past, and which has made the profession what it is; the present class is one from which only miserable mediocrity is to be expected.

Before proceeding to criticism, let me put into words the first thought which comes to mind on reading the doctor's paper. It is best expressed in the form of a question, as follows: Should not reform begin at the beginning,—that is, in the choosing of dental timber? In other words, does not the reform primarily demanded consist in the effecting of a fundamental change in the present class of dental students,—“the class that fill our colleges”? Concerning this class, I know nothing personally. Prof. Ingersoll speaks as an educator, and consequently as one having information; I must therefore believe that matters are as he represents. And, accepting his statement, the question which instantly presents itself is this: Is there not required something more radical than mere change in method or amount of teaching, when the majority of dental students are deficient in the essential properties of intellect,—“perception, analysis, generalization, comparison, and memory”?—saying nothing of “a disciplined mind,” which expression, uttered by a Master of Arts, probably means a classical education.

Leaving this preliminary question concerning the choosing of timber, we pass to the matter discussed by the essayist. He does not seek radical reform. He takes "the class that fill our colleges" as a fixed fact. He assumes that the average dental student must necessarily be, as he now is, ignorant and stupid; and implies, though he does not say, that this ignorant and stupid person, whether competent or incompetent to practice, must be given a diploma creating him a "doctor of dental surgery." On this fundamental assumption he bases his proposals of reform,—the first change advocated being the abandonment of lecture-teaching, and the introduction of the catechetic method together with the task system.

Admitting his premises, his conclusion is correct. The catechetic method is adapted to the intellectual instruction of the unintelligent. And the imposing of tasks, to be learned and recited, is an effective means of conveying doctrine to, and at the same time inducing habits of application in, persons of mediocre intelligence. Dr. Ingersoll does not distinguish between these two methods, though they are distinct. The catechetic is, as the word (from *κατά* and *ἡχέω*) signifies, a method of oral instruction. Originally, in Greece proper, it was devoid of questions. But when Greek became the tongue of Palestine, the word, though used also in a general way, to express oral communication of information, was applied specifically to the rabbinical teaching, which, altogether oral, probably had as its primitive feature a system of questions and answers; wherefore, in time, "catechetic" came to signify that method of primary instruction whose characteristic feature is the question. With us, the word is ecclesiastical, being transposed from the Palestinian Greek to the Latin and thence to the English; the method, and with it the word, was adopted from the rabbis by the early Christians (Luke, speaking of the evangelical instruction of Theophilus, uses the word—"κατηχῆσις":—a fact which, while it does not prove that Theophilus was "catechised" as a child, for Luke elsewhere uses the word to signify the spread of rumors, and here his expression quite certainly indicates communication of oral tradition without asking questions, shows how familiar was the word and probably the question-method to the earliest of Christian teachers); and the word and with it the method spread with the spread of Christianity (the novice in the Roman church was a "catechumenus"; and, in our own time, when the questions and answers are printed, the book is a "catechism"). So much for the history of the word, and incidentally of the method. The system, in spite of the fact that the catechism is printed, is one of oral teaching—spoken questions and responses; it is the Socratic method, brought down to the capacity of the humblest intellects. The task system differs from the cate-

chetie in that it is devoid of questions; and, furthermore, in that the student reads instead of hearing, and, if he learns, does so without the aid of the pedagogue. It is plain, then, that the task method is suited to a higher stage than the catechetie.

Dr. Ingersoll appears to have been led into the error of confounding these two systems by the fact that, under the task system, the pupil's performance of his task is ascertained by questions, asked by the taskmaster; he appears not to have noticed the difference between communicating instruction by suggestive questions, and testing performance by examination-questions. The question is the inevitable accompaniment of all intellectual instruction: in early instruction, it is asked for the purpose of awakening the pupil's curiosity; in later instruction, the desire for knowledge is taken for granted, and the question is not overtly asked, but is presupposed—"understood," as grammarians say. All intellectual instruction is followed by a test of the pupil's knowledge, or, at least, of his learning; here the question appears again, but with a quite different function. Dr. Ingersoll seems to have overlooked the fact that lectures are followed by questions—that the lecture system, like the task system, has its questions and answers.

After the task system comes the lecture system. It is adapted to a higher intellectual stage than the catechetie, and it has a different purpose from the task. It presupposes a broad intellectual grasp. The lecture deals with a subject. This subject it presents, analyzes, explains, illustrates. It is intended to leave its hearers with a comprehension of the subject with which it deals. Catechetie teaching is dogmatic or authoritative; lecture-teaching is rational or open to criticism. The task deals with fragments of truth; the lecture deals with the whole truth. Of course, the lecture system, dealing with subjects, presupposes in the hearers a capacity to grasp subjects. And, of course, the lecture system, being undogmatic, presupposes in the hearers a capacity for rational inquiry.

We may note another matter which Dr. Ingersoll appears to have overlooked. While the lecture system resembles the task system in that the questions are suppressed, it resembles the catechetie system in that its instruction is oral. This prepares us to find a radical likeness between the catechetie and the lecture systems, and a radical difference between these and the task system. This likeness and this difference we shall find. The task system is a system of *learning*; the catechetie and lecture systems are systems of *teaching*. It seems scarcely necessary to say that, in the art of education, the system of *learning* and the system of *teaching* have different functions, and that therefore the one cannot be effectively substituted for the other.



What, now, is our conclusion? It is, as was stated at the outset, that, if Dr. Ingersoll's premises are correct, he is right in the general drift of his proposal. We have seen that he has confused things which should be separated; but, having separated them, we see that his conclusion is just; persons of low intellect need the catechetical system for the inculcation of dogma, and inattentive persons need the task system for the induction of habits of application. We see, finally, that the lecture system is useful only when interest has been awakened, and when the intellect is able to actively or critically deal with subjects. Wherefore, the catechetical and task systems are proper, and the lecture system is improper, for "the class that fill our colleges."\*

I must add a remark, for the purpose of preventing misapprehension. When I speak of lectures, I mean lectures on science, or, rather, lectures whose purpose is not *persuasion*, but *conviction*. I mean lectures whose result is *understanding*. Dr. Ingersoll is certainly wrong in comparing such lectures with the "political speeches" by which votes are caught—speeches spiced with bonfires and adorned with the music of brass bands—speeches which skim the superficies of the superficial, never touching on political science

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\* Experience warns me that, to prevent misinterpretation, I must say fully what I mean, leaving as little as possible to be supplied by the reader. I therefore take the opportunity afforded by return of the proof to insert, as a foot-note, a remark which at the time of writing seemed to go without saying, and which therefore, to save space, I omitted from the text. It is this: The various methods of verbal teaching are not to be regarded as mutually exclusive; nor, I may add for clearness, is verbal instruction to exclude observational and experimental teaching. There are, essentially, two methods of intellectual education: the object method and the verbal method; the latter being, as we say in prescription-writing, the "adjuvant." The "basis," the fundamental essential, is actual bringing of thought into contact with things—in a word, *experience*. In an absolute sense of which Pliny did not dream, *usus magister egregius*. Nothing is more erroneous, as I have shown in the introductory portion of the present paper, than the popular belief that ready-made knowledge can be poured into the ears. Passing to verbal instruction, which is the adjuvant, useful only as an adjunct to the basis, but capable of enlarging the knowledge which rests on the basis to an almost infinite extent, we make a threefold division: there is the question method, the task method, the lecture method. Plainly, verbal or symbolic teaching does not exclude experience or actual teaching; and, similarly, the various forms of verbal teaching do not exclude one another. In man, there is the cellular or vegetative life; there is the muscular or animate life; there is the nervous or intelligent life. Do these three forms of life exclude one another? Do they not, on the contrary, not merely co-exist, but work together—assist one another? So is it with the three methods of verbal instruction. The question, the book, the lecture, should normally be found together; they should aid one another mutually. Though one method should be characteristically prominent, according to capacity of students, the others are not therefore excluded.

at all. He correctly says that, in spite of such speeches, "the political education of the people would be meager." It is meager. The educated man who, judging others by himself, doubts its meagerness, may set all doubt at rest by visiting the office of the registrar of voters, and putting to the average applicant for registration a few questions on any political subject, from economics to *jus naturale*.

Leaving the characters and purposes of the systems of inculcation, and the bearing of these characters and purposes on the subject of methods in dental education, let us sweep into the singular form the other main proposals of Dr. Ingersoll. These are, that the art-instruction of the colleges shall be narrowed, and that the science-instruction of the colleges shall be narrowed; in the singular form, the proposal is that the instruction of the colleges shall be narrowed.

We have seen that too much learning is evil—that, as every one has a physical capacity for development, so has every one a mental capacity for development; and that the attempt to force development beyond the bounds set by innate capacity is injurious. Here another truth must be noted—the truth that mental development, like physical development, requires time. As it is wrong to attempt to force development in amount, so is it wrong to attempt to force it in rapidity. We may "eram" the child or the student; but, by so doing, instead of rendering development more rapid, we shall injure the mental constitution.

There is, therefore, a sound general basis for Dr. Ingersoll's proposal. It is wrong to attempt too much; it is also wrong to attempt too much within a given time. Whether too much is now attempted by our colleges, I do not presume to say. Dr. Ingersoll speaks as one who knows. Presumably, therefore, the present curriculum is too extensive for "the class that fill our colleges."

We have now examined Dr. Ingersoll's cardinal proposals. We have seen, with regard to both these proposals, that, if we admit the doctor's premises, his conclusions are inevitable. Whether his premises are correct, is a question of fact on which, as I have already said, I cannot enter. I here formally accept them, because, with regard to observation-facts of this kind, it is impossible to attribute error to a gentleman of Dr. Ingersoll's eminent ability, occupying, or having for years occupied, a position which naturally gives him full knowledge of the capacities of the present class of dental students—that of dean of the faculty of a dental college or dental department of a university.

But while Dr. Ingersoll's general conclusions are indisputable, there is an important matter of detail which is not so. And I

wish, lest I be misunderstood, to mention this matter, and to express, with regard to it, my emphatic dissent. I refer to his requirement "that rules and principles be memorized from the text, word by word." Is the learning of words the learning of things? Is the rote parroting of verbal signs in any way equivalent to familiarity with the things signified? Is not the memorizing of texts an expenditure to no purpose—a waste? That the doctor's rote-learning is useless and wasteful, lies on the surface. Is it not, moreover, positively injurious? The fundamental truth, with regard to rote-learning, as with regard to other matters, will be found in the "extreme case." The rote-idiot, utterly devoid of what is commonly called intellect, repeats verbatim long stories of which he does not understand a word. Those who have not paid attention to idiocy may have seen the same phenomenon, in modified form, in the dunce of the class—who, sometimes, possesses an immense capacity for parrot-memorizing (and therefore passes unexceptionable examinations on subjects of which he knows nothing). Such is one phase of the truth. The complementary phase is seen in men of intellect, who, uniformly, forget everything which they hear or read—except its "substance." It appears, then, that there are two kinds of memory,—the idiot memory and the intelligent memory. Dr. Ingersoll's requirement cultivates the former and extinguishes the latter. No condemnation could be more complete. The doctor says that rote-memorizing has been demanded in [classical] "colleges and universities for more than a century." Perhaps this is one reason why nine-tenths of the "cultured" are intellectual dwarfs; perhaps we have here a partial explanation of the often-noted fact that the "valedictorian" is a pigmy in actual life. But, apart from this, every one who has used his eyes has seen at least the negative results of the parrot-requirement; and every one who has seen these results must admit that they are in precise accord with the expectations based on our premises; he must agree with Montaigne in the verdict that, not only theoretically, but also practically, "*savoir par cœur n'est pas savoir.*"

Our examination of Prof. Ingersoll's proposals is now finished, and all comments necessary for the avoidance of misunderstanding have been made. In conclusion, let us return to what was said at the outset. Let us return to the criterion there set up, and by it test the result of the doctor's "dental college education."

In making the test, I shall not suppose the student to have been subjected to the injurious process of rote-memorizing. I shall take a typical member of "the class that fill our colleges," and, when he has received the properly-reduced course of instruction, conducted in the way best suited to the requirements of his dull and undevel-



oped intellect, shall judge him by the dental criterion. I shall seek to ascertain in what measure the typical graduate of the present class possesses the attributes of a capable dentist.

He can extract teeth—not as well as a common tooth-puller, but he can extract them. He can make artificial dentures—not as well as the mechanic can make them for him, but he can make them. He can insert fillings—not as well as the apprentice in an old-fashioned dental office, but he can insert them. Such are his manual attainments. Intellectually, he has learned the usual number, position, and approximate shapes of the human teeth, can discriminate between a pulp-exposure and a polypus, and knows a routine treatment for gingivitis. Emotionally, he is proud as Lucifer; for he is puffed up with the conceit of the small mind—the all-knowing self-sufficiency which is the natural accompaniment of narrow-minded ignorance.

Judgment as to the advisability of an operation? No; he expects to be employed, not to advise, but to operate. Judgment as to the character of the operation to be chosen? No; he will leave the choice to the superior wisdom of the patient. Capacity to grasp obscure complications or distant results of dental pathology? Capacity to trace dental diseases to their systemic causes? Capacity to sweep his mind's eye over the life of his patient, and to plan operations and give instructions on the basis of this universal view? No; he has no concern with the patient's general welfare—not even as far as that welfare has to do with the teeth. Nor has he any concern with the patient's future—with results of operations or need of after-operations. He will perform such operations as the patient demands, and at such times as the patient demands them. Who taught him to consider the patient's welfare—to think for the patient? Who made him a judge—an adviser? Not his college, with the cramped curriculum proposed by Prof. Ingersoll. He is a doctor? Well, yes, he is—in name. In fact, he is not a doctor; he is not *doctus*, and is therefore incapable of being *doctor*.

I have hinted that, in the future, the dental profession may be differentiated into two sections,—the advisers and the operators. Will the result of Dr. Ingersoll's dental education fill a useful place in either of these classes? Let us see. Adviser he is not; he lacks, not merely the requisite knowledge (the intellectual ability); he lacks even the bare learning. Operator he is—in a lame way; he may, in time, improve; and then he may, if cured of the megaloccephalus with which he is afflicted by reason of his small mind, become of some value to the community. But primarily he is, even here, less useful than would be an uneducated but dextrous person, working under the supervision of a competent adviser.

To put it briefly, the man is a mere operator, and not a very good

one. He is able, in a mediocre way, to "pull teeth and fill teeth." But he is not able to properly *practice dentistry*.

Think, now, of a profession composed of mere operators, and not very good ones. Would it be a profession? No. It would be a sham. Composed of such material, the profession would not only cease to advance; it would drift back to the barber-shop where dentistry and surgery were born.

Such would be the ultimate result of Dr. Ingersoll's system of dental education. Dr. Ingersoll's conclusions are inevitable consequences of his premises. In other words, we are brought back at last to the fundamental reform which instantly presented itself when we glanced at Dr. Ingersoll's data. We find that the hope of the profession lies, not in fitting the system of instruction to the capacity of unpromising students—not in substituting intellectual milk for intellectual meat, and giving even milk in small quantity because of the puniness of the babes; but in choosing students equal to the requirements of an advanced method of instruction and an adequate curriculum—in substituting capable men for "the class that fill our colleges."

## TREATMENT OF TEETH HAVING FOUL PULPS.

BY A. RETTER, D.D.S., UTICA, N. Y.

(Read before the Union Convention of the Fifth, Sixth, Seventh, and Eighth District Dental Societies, at Elmira, N. Y., October 30, 1889.)

THE chairman of the Business Committee saw fit to place this paper on the list as "A New Method of Treating Teeth with Foul Pulp." However, when I reported the subject, I simply stated it to be upon the "Treatment of Teeth having Foul Pulps." There is nothing *new* about it, except that I beg leave to offer a few ideas upon this subject.

I will not divide this class of teeth into several classes according to the condition they are in at the time we receive them for treatment, but simply claim that whatever their condition may be, whether they are sore or not, with more, or less swelling, or perfectly quiet at the time a dead pulp is diagnosed, the first effort to be made is to open into the pulp-chamber and root and to remove the cause, which is the decomposed tissue in the canals and dentinal tubuli. Even where there is a certainty of pus and a fistula sure to form, the opening into the pulp and its removal will render the forming of a fistula less painful and limit its area; and quite often, if proper local and systemic treatment is resorted to, it will prevent a fistula altogether, and the tooth or root may be restored to a comparatively normal condition without useless destruction of tissue. If the tooth

is sore and very painful to be operated upon, then a sharp drill, a smooth-running hand-piece on the engine, the steadying of the tooth by the fingers or other mechanical aid, or the local application of cocaine, will aid greatly in accomplishing the object. In such sore and painful cases it is better to simply wash out the pulp-chamber, pass a fine broach into the canals to facilitate the escape of gases, and then if there is *merely pericemental inflammation* it may be reduced by the persistent local application of tincture of iodine and aconite, or iodine and cocaine, or the Darby pepper plasters. If there is a large swelling with pus at the end of the root so that a fistula is desired, the drilling through the alveolus will give quick relief. However, I hardly ever have to resort to this method, and would only do so with anterior teeth, or when I feel certain that I will strike the sac. With posterior teeth the drilling to reach the sac is nearly always an uncertainty, and in case of failure accompanied by increased pain and destruction of tissue. In such cases the pepper plasters and systemic treatment will aid in the matter promptly, reducing the pain in almost every case to a minimum, and often cause a resolution without a fistula. The systemic treatment consists in the administration of chloride of ammonium, a teaspoon level full to a glass of water, and out of that a tablespoonful every two hours until the face becomes flushed. It is a refrigerant and powerful resolvent and alterative. Iodide of potassium in doses of five to fifteen grains three times a day is also a valuable remedy, it being likewise a powerful resolvent and alterative. I use it especially in cases where there is a great deal of pus. In cases of simple pericemental inflammation, fluid extract of veratrum viride, a drop every hour until seven drops are taken, will prove valuable. Internal remedies are a powerful aid in these affections, and their use and administration should be carefully studied. I hardly ever treat a case but that I use internal remedies, and consider them of as much importance as local remedies.

My aim is always to first restore the tooth, and for that matter the patient, to a condition to be operated upon. As soon as this condition is established, the more thorough removal of the septic matter in the canal and dentinal tubes is commenced. To do this effectually the rubber-dam should be applied whenever possible. Having removed whatever more solid remnants there may be, I wrap a few fibers of cotton or silk around a broach and then repeatedly wipe or mop out the canal with a strong solution of ammonia, which aids in the desiccation of the septic contents of the canal and tubuli. It must be remembered that the septic matter is not only in the root-canal, but in the dentinal tubes. To remove it from or destroy it in these tubuli it must be reached by imbibition of fluids which



will change its character so it can be more readily washed out or subsequently affected by the germicides used. Carbonate of sodium packed into the pulp-chamber and root-canals and left for a day, well sealed in, will also accomplish this object. Indeed, I believe it to be one of the very best applications at this stage of the treatment, and I have the best success from it. It saponifies and renders soluble the septic contents so that they may be readily washed out with hot water and made ready for the dressing with a germicide. No substances which have the power to coagulate albumen should be used at this stage, for such action prevents the ingress or penetration of a germicide, as well as the escape of septic matter and its gases. A tooth may become well by their use at this stage of treatment, but if it does it is in spite of such unreasonable treatment and not on account of it. The washing with ammonia or the carbonate of soda treatment I invariably follow up with another thorough injection of peroxide of hydrogen. This agent is of especial value in cases of blind abscess or pus at the end of the root. It will penetrate it and cleanse it by combining with the pus-gases. It swells, effervesces, and thus drives out the pus. It will penetrate more readily and deeper than any drug of which I know.

Having thus removed the septic contents as thoroughly as possible, I dry the cavity carefully with hot air injected under pressure of from thirty to fifty pounds. For this purpose I have an air-receiver into which the air is pumped. From this it passes through a hot-air syringe. I dry the tooth thoroughly, and often am astonished at what an amount of odor is expelled, even after the most thorough and painstaking washing and mopping out of the canal. I consider this hot-air treatment as the very best means to be employed at this stage. Where a fistulous opening exists, it will force the pus clear through it better than anything I have ever seen, and it will also force the medicines clear through. Where there is no fistulous opening, it will drive the medicine to the points wanted. It will dry a tooth thoroughly and quickly, and put it in the best possible condition for the reception of the germicide dressing. When absolutely dry, I prefer to drill out a root-canal whenever practicable; in fact, any root that can be safely drilled. There is, perhaps, no better way of removing septic contents beyond any doubt. Drilling a root-canal is rendered much easier after it has been cleaned and dried as stated. However, labial roots of molars and anterior roots of lower molars cannot always be readily drilled out. There are some operators who claim they can do it. Well, let them do it. Years ago I broke an entire stock of dental drills in my vain efforts to do so, and since I can get along without it I prefer to take no chances, unless *I am sure of a good result.*

The dressing to be next applied to the tooth consists simply of cotton steeped or soaked in a strong solution of hydronaphthol in absolute alcohol. I have used iodoform and many other remedies, but have adopted this for the simple reason that I have as good, if not better, results with it than with any other drug. It is almost odorless, and being perfectly soluble in alcohol will, when placed in the tooth, penetrate into the tubuli on account of the affinity of the alcohol for water, thus abstracting the water from the contents of the tubuli and thereby robbing germ-life of one element of its existence, which is moisture. Hydronaphthol in my practice has filled the place of a germicide most successfully. I do not like the use of essential oils. Oil and water will not mix, and I prefer to avoid anything that has a tendency to clog the dentinal tubes. Perchloride of mercury in combination with tartaric acid, so as to prevent the formation of albuminates, is also a favorite dressing. I do not like to use it in the anterior teeth, for fear of subsequent discoloration. However, where this is not to be feared it is beyond doubt the most powerful germicide that can be applied. It also has a strong affinity for water,—a valuable quality for a canal-dressing. Iodol dissolved in alcohol is another good dressing, and, indeed, the antiseptics for this purpose are multiplying rapidly. It must be observed, above all, that it is not *alone* the drug that is employed which brings the effect, but the manner in which it is applied. Thoroughness is essential.

The dressing being applied, the tooth is sealed with gutta-percha and the patient dismissed for a week or more. If severe pain should ensue in spite of additional systemic treatment, I open the tooth again and wait a few days and then repeat the process. It is not often that after a thorough cleansing such a proceeding is necessary. Yet, even with the utmost care I do not save all teeth of this class, and sometimes in spite of my best efforts the forceps has to be applied. It must be borne in mind that in some constitutions the vitality is low and nature does not repair so readily, and though you may in such cases drown the tooth in germicides, though you may fill the roots ever so perfectly, in such depraved organisms at every depression they undergo a pulpless tooth is at any time liable to brew trouble.

If after the dressing has been applied for a time no trouble ensues and upon removal of the dressing no odor is perceptible, the tooth or root can be filled. There are those who advocate filling immediately after the first cleaning and drying of the tooth. I never could see any need in haste. In anterior teeth which can readily be drilled to the apex, if satisfied that the root is thoroughly clean and disinfected, such treatment may be resorted to, especially if

one cannot see the patient again. In posterior teeth, or in teeth with small and tortuous canals, it does not seem to me to be good practice; and it strikes me as absolutely essential that the contents of the tubuli shall be thoroughly sterilized beyond a doubt before the tooth should be closed permanently. True enough, if the foramen is open, a tooth after the first dressing is applied and sealed gas-tight often gives trouble and necessitates a reopening. Such soreness or pain is simply caused by septic poison, which will escape through the foramen, irritating the tissues beyond. Certainly, if immediately filled to the apex, such poison could not escape through the foramen, and immediate trouble might thus be avoided. However, it seems to me that this is deceptive, for the closing of the foramen does not do away with the septic condition of the tubuli, and although temporarily quiet such a condition of these tubes will sooner or later give trouble again by septic penetration through the walls of the root to the pericementum. The very symptom of a second appearance of soreness and pain after a dressing has been applied is a good barometer, indicating that your work has not accomplished all you wished it to do, and, therefore, you had better do it again. As soon as all septic matter is disposed of, there will be no more irritation through the open foramen.

Of course this reasoning does not apply to teeth that have never been inflamed or where the fresh pulp has been removed.

The after-success and comfort of teeth thus treated depends largely upon the care and choice with which the roots shall be filled. Up to this stage I have avoided, as much as possible, anything that might clog or close up the tubuli. Now I desire a material that will go to the end and soak into the tubuli as much as possible, and for this purpose I prefer two agents. The first is oxychloride of zinc, provided the canal is large enough to permit of its successful working. This material, from its affinity for moisture, will penetrate deeply and persistently into the tubuli, coagulating whatever tissue may be in them and rendering them non-decomposable. The second is a strong solution of hydronaphthol in alcohol, in which shellac is dissolved until it forms a thick paste. This material can be worked into the fine lingual root-canals, too fine to be drilled. It can be pumped clear to the apex with safety, and in my experience has proved itself an excellent filling-material for this class of roots.

In conclusion, I cannot refrain from again stating that the successful treatment of teeth with foul pulps depends largely first upon the thoroughness with which the decomposed tissue is removed or destroyed, and secondly upon the thoroughness with which the roots are filled and the space previously occupied by the decomposed tissue supplanted by a non-decomposable substance.



## FISSURE CHISELS.

BY W. STORER HOW, D.D.S., PHILADELPHIA, PA.

OPERATIVE dentistry is assuming an increasingly important position among the specialties of physical restoration and repair; hence anything that tends to the promotion of efficiency, and the saving of time in the performance of operations upon the teeth, is worthy of careful consideration and of adoption if found to be practically useful.

In the preparation of crown cavities for filling with gold or any suitable material, there are frequently encountered difficulties which severely test the skill and patience of the dentist, but among them all there is probably no class of cavities that are more troublesome than those termed fissures, which are of every degree of minuteness and run in every direction over the crown surfaces of the molars and bicuspid. The hard, smooth, thick, and sloping walls of enamel on either side of a fissure render it an extremely difficult matter to cut such a channel or groove as will retain a filling and properly protect the tooth from a recurrence of caries.

Time and space will not be taken to criticise well-known instruments and their equally well-known defects, but by means of illustrations and succinct descriptive matter, some new fissure chisels and the methods of using them will be made apparent.

Fig. 1 represents the forms and sizes of the chisels, and the distinguishing features are: First, the duplex clearance of each blade away from the cutting-end, as will be seen by a close examination of the respective edge-views of the several numbers; the object of such clearance being to permit the cutting of a square-walled groove by operating only on its floor, without the risk of, or the waste of energy by, jamming the chisel between the walls. The groove is thus the more readily deepened because the force is all expended on the floor, which is also cut nearly square with the walls; therefore a filling can be securely packed in a comparatively shallow groove, so that the amount of cutting necessary to be done in preparing the cavity is by so much further diminished.

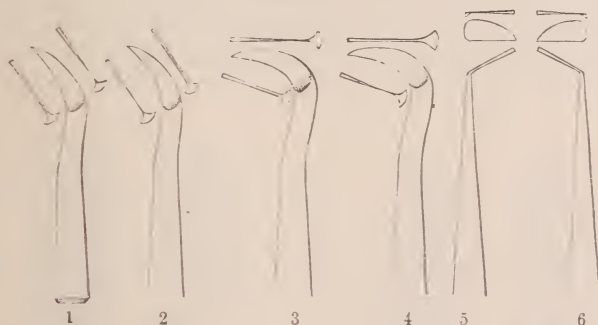
Second, the chisels are very thin, and consequently require the least practicable amount of hand-pressure applied directly and firmly in line with the groove by reason of the peculiar clearance and great stiffness of the wide yet thin blades.

Third, the cutting-edge is narrow, yet slightly beveled in the direction and at the angle shown in Fig. 2, the process of sharpening being to bring the blade to an acute wedge-shape, and then by a single cross-stroke on the whetstone at the angles indicated by the dotted lines in the illustration, a strong but penetrating cutting-

edge is formed, and will be lasting because the point of each blade is left very hard. The plane of the bevel for No. 1 or No. 3 is that of the dotted lines of 1, Fig. 2; and the bevel of No. 3 or No. 4 is that of the dotted line of 4, Fig. 2.

The thinness and hardness of the blades of course render them liable to breakage by improper twisting or cross-pushing or pulling strains, but the glass-hardness is necessary for enamel-cutting, and the risk of breakage by proper usage is next to nothing. To illustrate

FIG. 1.



such usage, some sectional views of a molar with the blades in proper operative positions are supplied by Figs. 3, 4, and 5, wherein arrows indicate the direction of properly applied force, and the narrowness and squareness of the grooves cut are made apparent. The numbers seen in these figures are the same that identify the like chisels of the set. Contrary to common practice with such instruments, these chisels increase in strength and effectiveness as the blades wear

FIG. 2.



FIG. 3.



FIG. 4.



FIG. 5.



shorter and get thinner at their cutting ends, until they are nearly half worn away.

It will be noticed by closely examining Fig. 1 that the *inner* edges of Nos. 1 and 3 are thicker than their *outer* edges, while Nos. 2 and 4 are thickest at their *outer* edges. It follows that for slightly scraping the sides of crown-cavities a *draw-cut* can be made with No. 1 or No. 3, and a *push-cut* with No. 2 or No. 4. Such scraping cuts may also be made with the blade ends to deepen fissure-grooves in the lingual or buccal slopes of the crowns. Nos. 5 and 6, being

right and left respectively, cut *laterally* in either direction, and are, therefore, expressly adapted for use in cavities so located.

By these means the wider openings, as well as the fissures of this whole class of crown-cavities, may be quickly and thoroughly prepared. Especially may the little crevices on the slopes of the crown-cusps be cut out with these thin blades, so that there will be the least loss of tooth-substance consistent with complete preparation for faithful filling.

It may be well to premise that, although the following illustrations have been drawn from extracted natural carious teeth, and from such teeth after preparation solely with the fissure chisels, due allowance must be made for the fact that the engraver is not a den-

FIG. 6.

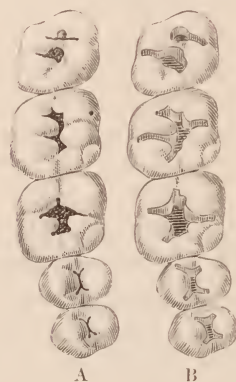
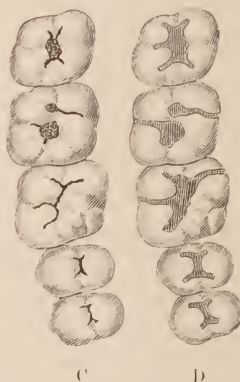


FIG. 7.



tist, and so could not be expected to keep in view minor details which only the dental practitioner would recognize as common characteristics both before and after preparation of the cavities.

In Fig. 6, A indicates the superior bicuspid and molars of the left side, all more or less carious, while B of the same figure represents those teeth when the cavities have been prepared by the use of the fissure chisels. Fig. 7 shows at C carious teeth of the like class, and at D the same after they have been likewise prepared and suitably filled. Typical inferior bicuspid and molars of the left side, and exhibiting different degrees of fissure and coronal caries, are seen at E, Fig. 8, and the cavities after preparation appear as shown at F of the same figure. Examples of similarly affected inferior teeth of that side are illustrated at G, Fig. 9, and the teeth, upon the completion of the operations, resemble those represented in the figure at H.

In preparing cavities like those of the third molar in A, Fig. 6, the septum would usually be cut through and the cavities be made



one, and for connecting them by a narrow groove, chisel No. 1 would admirably serve; but the example given in B is designed to exhibit the nicety with which such cavities may be shaped singly by the chisels Nos. 5 and 6. The other examples in all the lettered illustrations are sufficiently explicit without detailed description. Fig. 10 is added to emphasize the need for chisels which will enable the operator to easily and quickly follow every fissure to its exterior termination. The filled molars of the figure appear as types of a common class of cavities which are frequently filled without due regard to the initial fissures, the quite too common custom being to cut the margins of the main cavities with round burs or chisels that are much too large to enter the radiating fissures, that subsequently develop into destructive defects which endanger the safety of the otherwise

FIG. 8.

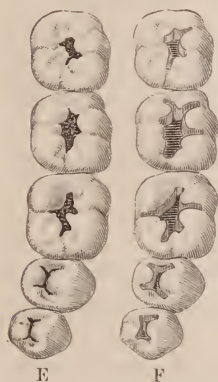


FIG. 9.

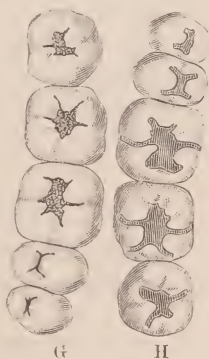


FIG. 10.



well-filled teeth as represented in the last illustration. Every dark line which indicates incipient fissure caries should immediately claim the preventive attention of the dentist.

In the preparation of compound approximal cavities, the following out of coronal fissures or the cutting of narrow divergent retaining grooves or slots may be readily done with these chisels. It is no small advantage to be able rapidly to cut out those troublesome central fissures in bicuspid, and also to dig down at the fissure-ends so that the filling will have secure anchorage after a touch or two of the smallest inverted cone-bur. Indeed, the anchoring finish of the floors of all the grooves with that, or with the smallest wheel-bur is an easy and expeditious affair after the fissures have been cut out with the chisels.

Even when diamond disks or points have been used, the chisels are excellent for completing the grooves so cut.

Particular stress is laid upon the following of the prescribed manner of using and sharpening these chisels, because their greatest

efficiency depends upon the observance of the precise methods described and illustrated.

In addition to the usefulness of the fissure chisels for the specific purposes of their design, they will be found available for the excavation of many large approximal cavities; for trimming the edges of such cavities, especially between the oral teeth, and for the removal of calcareous deposits from all the teeth. Indeed, it is confidently anticipated that the fissure chisels will be found among the most indispensable instruments of the dental operating case.

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## PROCEEDINGS OF DENTAL SOCIETIES.

### FIRST DISTRICT DENTAL SOCIETY, STATE OF NEW YORK.

THE First District Dental Society of the State of New York held a regular monthly meeting, Tuesday evening, October 8, 1889, in the New York Academy of Medicine, No. 12 West Thirty-first street.

The president, Dr. A. L. Northrop, in the chair.

Dr. V. H. Jackson, chairman of the Clinic Committee, read the following

#### CLINIC REPORT.

A stated clinic of the society was held this afternoon at the depot of The S. S. White Dental Manufacturing Co., Broadway and Ninth street.

Dr. A. Retter, of Utica, N. Y., described and illustrated with models his method of making continuous-gum bridge-work, which consists in baking a body and gum enamel to tooth face-pieces, and providing such a block with a base which fits perfectly to the gum or alveolar ridge to prevent food from crowding underneath, with a backing of platinum made in such a manner that an articulating or masticating surface of gold can be soldered to the backing and then soldered to a bar of gold or platinum, or gold crowns or bands, that have been fitted to the teeth or roots in the mouth. To make the block or bridge, an impression is taken with the bands or crowns in place to be used for anchorage. From this impression the usual plaster model is obtained with the band or crown anchorage in its proper place. After scraping the plaster model, the exact space the saddle is to occupy is marked on the surface, making it no larger than is absolutely necessary. A piece of platinum as thin as writing-paper is then burnished to the model and trimmed to the shape required. Then to the saddle the porcelain face-pieces selected for the purpose are fastened and held in position by a drop of wax on the labial side, and then the saddle and

face-pieces are placed in the usual soldering investment, with the pins of the face-pieces and the lingual portion of the saddle exposed. A piece of thin platinum of proper length is fitted to the pins of the face-pieces in such a manner that the pins just penetrate the platinum backing. This backing is made to join the saddle and broad enough to project above the face-pieces. A little more investment-material is then added, leaving exposed only the part to be soldered. The piece is then soldered with pure gold, uniting the pins to the backing and the backing to the saddle. Upon this is baked body and gum enamel, and the projecting portion of the platinum backing burnished on to the edges of the face-pieces or gum-block. To get the articulating or masticating surface, add wax to the block and carve it just as the articulation is to be; then dip the surface of the block into plaster, remove the wax, and pour into this plaster impression Melotte metal, and thus obtain a die, to which make a counter-die, and strike up a piece of 22-carat gold of about No. 32 in thickness, to form the articulating surface, which is then waxed in place on the block, and also waxed to the bands or crowns on the model and again invested and soldered. The result will be a neat piece of bridge-work, with a continuous gum covering but little surface on the natural gum. . . . Dr. W. C. Deane, of New York, showed an adjustable tooth-brush designed by one of his patients, Mr. Lichenstien, which was made with a German-silver joint connecting the brush and handle so that the brush can be turned and set at any angle by touching a spring which acts in a ratchet. Dr. Deane also showed models of a mouth where a permanent central incisor had been extracted when the patient was young, and the lateral incisor had not fully erupted, which was drawn to the position the central should have occupied by the use of a U-shaped piano spring extending forward from a rubber plate to which a rubber band was fastened by ligature and also to the tooth. . . . Mr. E. E. Clark presented numerous samples of Ward's electro-metallic dental plate. . . . Dr. W. T. Dobbs, of Brooklyn, presented himself as patient with a tooth that had been troubling him about six months. It was a lower second molar. Several dentists had treated it, and there seemed to be some question as to the cause of the trouble. Counter-irritants had been applied, and a small gold filling had been removed from the grinding-surface. The tooth was sensitive to heat and cold, but there was no sensitiveness in cutting in the cavity. Dr. W. H. Atkinson diagnosed the trouble to be pulp-stone, or ossification of the pulp, and pyorrhea alveolaris. . . . Dr. J. A. Kimball, of New York, presented a non-detachable cap or stopper for a tooth-powder bottle, which can also be used with liquids. . . . Dr. Charles



Kells, Jr., of New Orleans, presented a brass gauge to measure the length and width of artificial teeth, to assist in ordering from dealers, etc. It is made similar to a shoemaker's measure, and appears practical. . . . Dr. V. H. Jackson, of New York, presented a boy fourteen years old, the upper teeth of whom had been too prominent, which were corrected by a method described at the anniversary meeting of the First District Dental Society. (See DENTAL COSMOS, vol. xxx, page 510.) The first bicuspid on each side of the upper arch was extracted, and a rubber plate was made to cover the roof of the mouth, with a space left opposite the teeth to be moved, and retained with piano-wire clasps about the molars and bicusps, and a piano-wire spring extended from the plate through the space made by extracting, on either side, to the front of the arch, and arranged to draw the teeth back toward the rubber portion of the plate. . . . Dr. J. M. Edmunds, of New York, called at my office, September 27, with Dr. Juan José Ross, of Guatemala, Central America, to show a crown supported with Dr. Edmunds's "metallic capsule" (see DENTAL COSMOS, vol. xxxi, page 550), inserted in the mouth of Dr. Ross four days before. On examination, the crown, which was a right superior incisor, was found to be exceedingly firm. The alveolar process was considerably absorbed before the operation. There was no soreness on pressure, and no marked congestion to be seen. Dr. Ross was very confident as to the practicability of the capsule, and will keep us posted from time to time as to the result.

Dr. George Evans read the following paper, entitled

#### A SYSTEM OF GOLD SEAMLESS CONTOUR CROWNS.

Mr. President and Gentlemen: As we progress in scientific attainments we acquire a clearer comprehension of the general principles involved in the practice of dentistry, a better understanding of the effects of therapeutic agents, and become consequently more competent to institute improved methods of treatment; so, as we advance in artistic skill, we are enabled to correspondingly extend our sphere of usefulness. Both science and art are necessary in every department of dental practice to secure the best results, and it is the results which determine our value as a profession.

Dental art is therefore equally entitled with dental science to presentation and discussion in dental associations; but elementary teaching in such associations is out of place, whether in art or science, in theory or practice, in surgery, therapeutics, or mechanics.

Unquestionably the most notable artistic advance in dentistry of late years is crown- and bridge-work. In my judgment, this department of our work has reached a stage of development clearly en-

titling it to rank as a specialty of dentistry, independent of both the operative and the so-called "mechanical" branches, and as such to a distinct place in the curriculum of the schools. That I am not alone in this opinion there is abundant evidence. Dr. Louis Ottofy, in a recent report on dental literature to the Illinois State Dental Society, expresses the belief that crown- and bridge-work "should be a department of itself, and not classified with either operative or mechanical dentistry." The inference is clear that the importance of this special work in dental prosthesis demands a more comprehensive and systematic study than it has heretofore received.

That which I am about to submit to you is offered as a contribution toward the systematizing of one branch of the subject—a practical tabulation of gold crowns. This paper has been prepared at the request of many members of the profession, and describes what I have designated as a "system" of gold crown-work.

The methods of constructing all-gold crowns commonly employed are difficult and laborious, and the results, at the hands of many competent in other directions, are anything but artistic. Then, again, the time consumed and the expense incurred in their construction are not sufficiently remunerated, except by fees which many patients are either unable or unwilling to pay. It was to remedy this—to place artistically-constructed gold crowns practically upon the same basis with porcelain crowns, at the disposal of the dentist of average attainments and within reach of the patient of average means—that the gold seamless contour crown system was devised.

The use of these crowns affords to the dentist the opportunity to obtain with little labor the most artistic results. They represent perfectly in anatomical contour the cervical, middle, and occluding thirds of the natural teeth. They present a surface of metal which is uniform in grade and color, and which will not tarnish, each crown being made quite thin, of one piece of fine gold, and consequently entirely seamless. Their forms and structure conveniently admit of any necessary alteration of shape to suit the special requirements of the case in hand. They are easily and quickly adjusted, requiring only ordinary skill in their application.

For obvious reasons, the gold seamless contour crowns are made for bicuspid and molars only. There are sixty-four sizes, gauged by the dimensions of the occluding surfaces. Most of these sizes are made with three forms of cervix, small, medium, and large, a few having only the small and medium cervices. The total number of forms is one hundred and eighty-three, systematically arranged so that the most suitable crown for a given case can be at once selected without difficulty.

The various forms are as follows :

Superior bicuspids with occluding surfaces corresponding in shape to the form shown in Fig. 1, nine sizes; each of which is made with

FIG. 1.



FIG. 2.

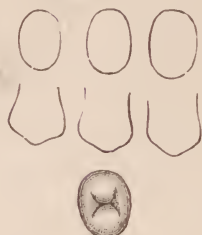


FIG. 3.



FIG. 4.



FIG. 5.



FIG. 6.



FIG. 7.



FIG. 8.

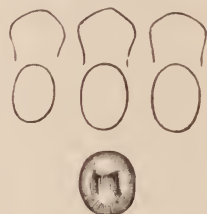


FIG. 9.

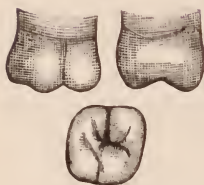


FIG. 10.

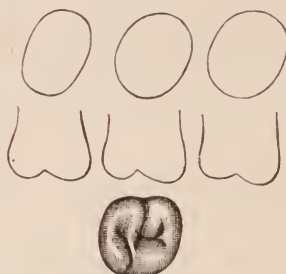


FIG. 11.



FIG. 12.

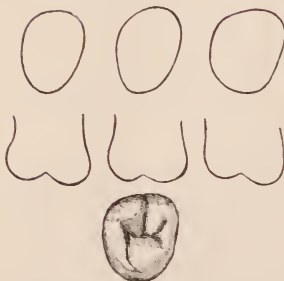
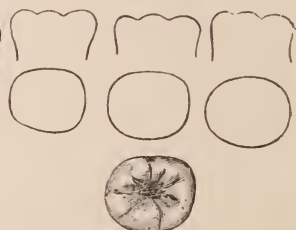


FIG. 13.



FIG. 14.



three forms of the cervix or collar section, small, medium, and large (Fig. 2).

Superior bicuspids with occluding surfaces like Fig. 3, five sizes; each with two forms of cervix, small and medium (Fig. 4).



Inferior first bicuspid with occluding surfaces like Fig. 5, seven sizes; each with three forms of cervix (Fig. 6).

Inferior second bicuspid with occluding surfaces like Fig. 7, seven sizes; each with three forms of cervix (Fig. 8).

Superior molars, right side, with occluding surfaces like Fig. 9, five sizes; each with three forms of cervix (Fig. 10).

Superior molars, left side, with corresponding occluding surface, same sizes and cervix forms.

Superior second molars, right side, with occluding surfaces like Fig. 11, seven sizes. The five largest sizes are made with three forms of cervix (Fig. 12); the two small sizes with two.

Superior second molars, left side, corresponding in sizes of occluding surface and cervix form.

Inferior molars, right side, with occluding surfaces like Fig. 13, six sizes; each with three cervix forms (Fig. 14).

Inferior molars, left side, to correspond.

It will be observed that in the bicuspid the same form serves for either side, while for the molars complementary forms are required. These generic forms practically include many more, as they are readily altered to suit special cases. In many instances, inferior second bicuspid crowns can be used for first bicuspid, superior second molars for first molars; the smaller sizes of both upper and lower molars answer very well for third molars.

#### *Method of Inserting Gold Seamless Contour Crowns.*

Every operator of much experience in setting gold crowns will have his own methods of working; but as the presentation of such a system as that here discussed would not be complete without some suggestions as to the best manner of inserting the crowns, I shall describe the methods which have been most successful in my hands.

The use of the gold seamless contour crowns can be best explained by the description of a typical case. For the purpose of illustration take a superior first molar, with nearly all of the natural crown in position.

*Preparation of the Natural Crown or Root.*—The hygienic requirements having been attended to, the next step is the proper shaping of the tooth or root. Smooth, level, parallel sides facilitate the adjustment of the gold crown, the collar section of which must be accurately adapted. To this end the root and so much of the natural crown as remains are trimmed with files, corundum disks, and wheels until the sides are as nearly as possible longitudinally parallel. At the approximal sides sufficient of the tooth-substance should be cut away to allow a free space between the artificial crown

and the adjoining teeth at the cervical portion for the gum septa. If less than one-half the length of the natural crown remains, it should be built up, or a post should be inserted to afford a secure support for the artificial crown. Posts of iridio-platinum or silver wire, with their points fitted and cemented in the root-canals, will serve to support the crown or furnish a hold for the amalgam (Figs. 15 and 16).

FIG. 15.



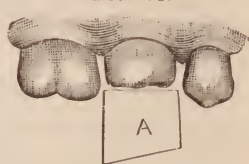
FIG. 16.



FIG. 17.



FIG. 18.



When the natural tooth is decayed beyond the gum-margin, it should be restored with amalgam (Fig. 17) so as to permit the part to be properly shaped as before described. It is understood that when amalgam is used for such purposes it is to be allowed to set before the adjustment of the crown is proceeded with.

In the typical case taken for illustration, the natural crown when prepared for the reception of the gold crown appears as shown in

FIG. 19.

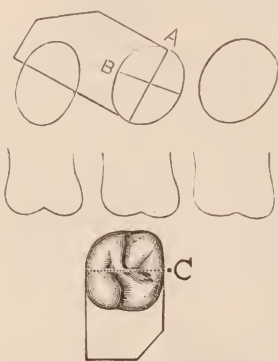


FIG. 20.

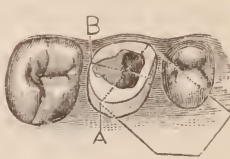


FIG. 21.

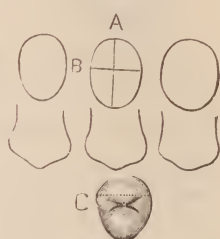


FIG. 22.

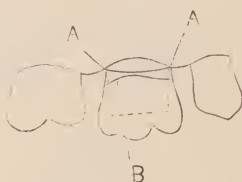


Fig. 18. The next step is the selection of the proper crown for the case.

*How to Select a Suitable Crown.*—The dimensions of the crown required, from the anterior to the posterior sides of the occluding surface, are first obtained by measurement with a piece of card-board or thin copper plate, cut as shown at A, Fig. 18. The measurements can be taken direct from the mouth or from a plaster cast made from an accurate impression of the entire arch. With these

measurements as a guide the proper-sized occluding surface is readily found by comparison with the dimensions of the various crowns as shown on the chart (C, Fig. 19). The size of cervix required can be determined by measuring from the labial to the palatal, and from the mesial to the distal sides of the root, as shown at A and B, Fig. 20, and then again comparing with the sizes given in the chart, as seen at A and B, Fig. 19. The same plan is applied in taking measurements of the bicuspid. (See A and B, Fig. 21.)

Another way of determining the size of cervix required is by measuring the cervix of the root to be crowned with a piece of fine wire, and then applying it to the forms of the crowns or to their representations on the chart. Experts in crown-work can usually determine this point by the eye alone. In making the selection it should be borne in mind that the cervix of the gold crown should preferably be smaller than the root it is to encircle rather than larger, as it can always be easily expanded, while its contraction is difficult. It is not essential that the curve of the collar shall correspond with that of the tooth. The gold will readily take the proper shape as the crown is adjusted.

*Fitting the Crown.*—The crown having been selected, it is slipped over the end of the prepared tooth and gently pressed or worked toward the gum-margin. The collar portion assumes the shape of the root during this operation. When the edge of the collar meets the gum-margin (A, Fig. 22), a line B parallel to the gum-line is marked on the gold with a sharp-pointed instrument. The crown is then removed and the edge trimmed parallel to this mark (A, Fig. 23) with small curved scissors, taking off a little at a time and trying the crown as the work proceeds, until the edge of the gold meets the gum evenly at all points. The edge of the gold is then beveled and polished, and the crown readjusted and pressed up under the margin of the gum, when, if the occlusion is correct, a burnisher is passed around the cervical portion and the collar burnished accurately to the root.

If the collar of the crown needs enlargement, it is easily and most properly accomplished with expanding forceps (Fig. 24), the points of which should be introduced at first just within the edge and the gold spread sufficiently to allow it to fit over the end of the natural crown or root, the process of expansion being gradually continued as the crown is brought into position. By proceeding in this manner too great expansion is avoided. If the entire crown needs enlargement, it is best done by softening a mass of gutta-percha, of about the same size as the crown, upon the closed ends of a pair of expanding or clamp forceps, which are heated for the purpose. The forceps points, armed with the gutta-percha, are then in-



troduced inside the collar of the crown, which should be moistened to prevent adhesion. The gutta-percha is next withdrawn, hardened in cold water, and cut through the center between the points of the forceps. This makes practically an expanding sectional mandrel, with which the neck of the crown can be enlarged in the direction (Fig. 25) in which the points of the forceps were first inserted.

The shape of a portion of the collar or side of a crown can be altered by slipping it over the point of an anvil, or the end of a pair of expanding forceps or of a small round-handled instrument held in a vise, and then tapping the part to be altered with the flat end of a riveting hammer. The crown should be frequently annealed during any of these operations.

FIG. 23.



FIG. 24.



Before the crown is pressed up to its apparently proper position, the occlusion should be examined and calculations carefully made to obviate any defects of articulation, which can be readily corrected at this stage by proper manipulation of the crown. Any necessary change in the form of the occluding surface can usually be made with the crown in position on the tooth by means of an instrument tapped by the mallet; or by removing the crown and burnishing the part; or by holding the crown between the thumb and forefinger, with the edge of the collar resting on the side of the next finger, which, when necessary, can be protected with a napkin, and tapping the gold with the point of the riveting hammer (Fig. 26). The sides can be depressed by changing the position of the crown and using the flat face of the hammer.

*Strengthening the Crown.*—These crowns are purposely made thin to facilitate their adjustment and necessary alterations in shape; but any desired strength or stiffness can be imparted to them without liability of melting the gold forming the sides, a difficulty which has been urged against their use. The strengthening material should always be placed upon the inside. Where the cusps or occluding surface requires filling in or thickening, it is safely and easily accomplished by the proper use of prepared gold solder filings. These prepared filings are made from a thick piece of solder grasped in a vise, with a clean flat-plate file. The filings are allowed to fall into a box or upon a sheet of paper, and a magnet is passed through them to remove any minute particles of steel detached from

the file. To five parts of the filings is added one part of Parr's prepared flux or of finely vitrified borax. Solder prepared in this way is not only useful for strengthening crowns, but in fine soldering-work of all descriptions it is much to be preferred to solder cut in small pieces, as the fine particles separately take up the heat and fuse more easily. The flow of the solder also is under better control.

The prepared filings are carried in a dry state with a spoon-shaped excavator, and packed in position in the cusps or placed on any desired spot. The crown is then held in the flame of an alcohol lamp and slowly heated to a cherry red, which is sufficient to fuse the filings, which will melt down exactly where they have been placed. During the process the crown should be grasped on one side, at the extreme edge of the collar, between the points of small tweezers, and held in such position as to present a full view of the

FIG. 25.



inside. The melting of the solder is thus instantly seen, when the crown should be quickly removed from the flame. If it is desired to strengthen the sides of the crown also, the surface of the interior is first dampened with

a piece of cotton moistened with water on the end of an instrument, and a quantity of solder filings placed in the crown and shaken around against the sides. A portion will adhere evenly all over the damp surface, and the surplus is then dropped out, the quantity required in the cusps placed in position, and heat applied as described, when the solder will be fused evenly over the surface of the gold without melting the sides or materially changing the general form of the interior of the crown.

If it is found that too much solder has been applied at any part, it can be trimmed and smoothed with a small corundum-point. Flux or oxidation may be quickly removed by heating the crown to a dull red and immersing it in acid. These crowns can be filled in an easy and inexpensive manner by packing the lower section with amalgam from which the mercury has been well pressed. In a crown so filled, where there are no antagonizing teeth, the result is the same as though the inside of the occluding surface was filled with gold; but if antagonizing teeth are present, the surface will in the course of time probably wear through in places and expose the amalgam.

If the tooth is short and the occlusion of a character requiring the reduction of the collar to such a degree as to suggest insecurity

FIG. 26.



when the crown is cemented, a headed or barbed pin which will anchor in the natural crown or root should be soldered in the center of the gold crown as shown in Fig. 27. This is done by passing the pin through a hole drilled in the occluding surface of the gold crown, which is then adjusted in the mouth, removed, invested, and the pin soldered from the outside. If the pin is tapered and fitted tightly to the hole, the soldering can be accomplished without investing by holding crown and pin, with the solder in position, in a blue flame.

The polishing of the crown is best done with pumice and moosehide points on the engine, and whiting and brush-wheels on the lathe.

*Cementation.*—The gold seamless contour crowns should be inserted only with oxyphosphate cement. A vent-hole should be put in the deepest fissure of the occluding surface of the crown for the escape of air and surplus cement. As the collars of the crowns can be very closely adapted, the vent-hole had better be made early in the operation of adjustment, to facilitate the removal of the crown by the admission of air.

During or just after the setting of the cement, the collar should

FIG. 27.



FIG. 28.



be burnished close to the sides of the root by passing a burnisher around under the gum-margin.

Fig. 28 represents the typical crown cemented in position.

I wish to be distinctly understood as making no claim that the system of crowns which I have described is of universal application. It will, through the facilities afforded for the alteration of the typical forms presented, fulfill the requirements for nearly every bicuspid, most lower molars, and a large proportion of upper molars. The cases which it will not meet are those where a contracted space requires a very abnormally-shaped crown.

What I maintain as its distinguishing feature is, that it so simplifies gold crown-work that by its aid dentists generally will be enabled to perform a large majority of their crown operations in an easy manner, with artistic results, and with little labor and expense to themselves, when compared with other methods. The advantages of a ready-made gold crown which meets the esthetic demands are not to be overestimated. It has been claimed that such a crown was not practical. This system, I feel assured, demonstrates the falling of that claim, and lays the foundation for a wider application of gold crown-work than has heretofore been possible.



On motion of Dr. Dwinelle, the thanks of the society were tendered to Dr. Evans for his very interesting paper and illustrations.

Adjourned.

B. C. NASH, D.D.S., *Secretary*.

## UNION CONVENTION OF THE FIFTH, SIXTH, SEVENTH, AND EIGHTH DISTRICT DENTAL SOCIETIES OF THE STATE OF NEW YORK.

THE twenty-first annual Union Convention of the Fifth, Sixth, Seventh, and Eighth District Dental Societies of the State of New York was held in the Masonic Temple, Elmira, N. Y., Tuesday, Wednesday, and Thursday, October 29, 30, and 31, 1889. The convention was called to order at 2.30 P.M., by President E. D. Downs, who delivered the annual address. The usual routine business was transacted. Dr. F. W. Low, of Buffalo, read a paper entitled "Between Two Evils," the object of which was to formulate for discussion a problem in catoptrics. An important question as to appearances is considered with reference to all fillings which involve the approximal surfaces of the oral teeth.

Given an oral tooth with an approximal decay, the outlines of the cavity from its labial aspect barely showing: required a gold filling. Problem, shall the anterior wall of the cavity be chiseled out sufficiently to allow this portion of the finished filling to show? If so, to what degree?

The first interrogative the essayist said he was disposed to answer yes. In illustration of this position he exhibited models and diagrams showing the effect of rays of light striking objects at right angles, acute angles, and obtuse angles, and the modifications of the effects by the background, such as the darkness of the oral cavity behind the teeth. He argued that operators who deemed it a curse to sacrifice the least portion of normal tooth-structure, and who filled approximal cavities in bicuspid teeth which he would probably convert into compound approximal, were sentimentalists, and that he who failed to chisel freely would find in after-years that he had not built wisely: that something more than conservation of tooth-structure is required, and that a glint of gold is better than a leaden shadow, which is the effect obtained in the effort to avoid the glitter; that at all points between a full and half light upon the surface of the filling there seems to rest a shadow. Dr. Low contended that an angle of forty-five degrees is the best reflecting line to produce from the anterior curves of small gold fillings in the oral teeth.

### *Discussion.*

Dr. G. V. Emens, of Fulton, agreed with the author of the paper that it was better to cut away the enamel in cases of approximal

cavities and bring the gold forward. There is nothing lost, and there is much better opportunity for inserting the filling and finishing and polishing it properly than where the space is so confined as in the strictly mesial cavity. Not infrequently gold fillings in such positions are mistaken for cavities filled with decay, much to the annoyance of the patient and loss of reputation to the dentist.

Dr. E. C. Rishell, of Athens, Pa., did not think it well to cut away much of the tooth-substance for the sake of bringing the gold filling more prominently into view, and in some mouths where the lips and moustache shaded the teeth the effort would be wasted unless the gold was brought clear around to the labial surface.

Dr. F. E. Howard, of Buffalo, thought that nothing was gained by bringing the filling forward. If the filling did not extend to where a ray of light would be reflected from it to the eye, the ray would be reflected from the surface of the enamel, which would certainly be better. When a patient said that the filling looked like a spot of decay, he directed the use of floss silk. When the filling is kept bright, it will not look like decay.

Dr. F. A. Greene, of Geneva, said that in such fillings it is usually better to fill from the lingual face. To open so far to the front would sacrifice too much of the tooth-substance. He would keep the filling out of view if possible, and direct it to be kept bright so that it would not appear black. There is danger that any new method of practice will have what might be called a "boom" and be carried to an extreme that will do much harm. The history of the last few years gives several instances of such booms, and it would be very disastrous if what is said here should lead any dentist to an indiscriminate cutting away of the enamel in the oral teeth in order to bring approximal fillings into greater prominence.

Dr. M. B. Straight, of Buffalo, thought that where the cavity is small in extent, if the filling be brought out into the light and finely contoured it is a thing of beauty; but if left in the region where the light cannot strike it so as to be reflected, it will appear to be a spot of decay. If the filling is inserted from the under side it will show through the enamel as a dark spot, and the patient will be much better satisfied if this enamel is cut away and the filling brought to the surface.

Dr. W. A. Barrows, of Buffalo, said if the question was which of the two evils was to be chosen,—too great a prominence of a gold filling, or one so placed that it looked like a cavity of decay,—he would certainly prefer bringing the gold out where it would look like gold.

Dr. Low said there seemed to be a misapprehension in regard of what he desired to favor. He did not intend to bring the filling out to the center of the tooth, but only so far front that the eye could

see that it was gold. The class of operations where this will have to be decided upon are small fillings in the approximal surfaces. Of course where the cavity is extensive the filling will be in sight, but in small cavities at this point a gold filling, if the cavity is not enlarged, will always look bad.

Dr. F. B. Darby, of Elmira, said he had observed finely-finished gold fillings in such positions that they looked like decay. He would try cutting out more and make the gold show.

Dr. F. S. Howe, of Ithaca, said that when patients said they did not want the gold to show he explained to them that unless it shows the tooth will have the appearance of having a dark spot on it, and then they generally permit him to use his judgment.

Dr. B. S. Byrnes, of Memphis, Tenn., said that he had been worried by the unsightly appearance of gold fillings in small approximal cavities, and had tried to overcome it by making the surface of the filling concave, but he was convinced that a convex filling brought sufficiently forward to show the gold was the better plan.

Dr. C. T. Howard, of Rochester, said that there was no possibility of destroying the dark line shown by a gold filling between the teeth, because the rays of light which strike that part of the filling will still show dark; the addition of gold farther forward will not affect the direction taken by the rays which strike and are reflected from this part of the filling.

Dr. Low. No; but the human eye is so easily deceived that when it sees the gold on the outer part it will record it all as bright gold.

The subject was passed.

Dr. G. W. Melotte, of Ithaca, exhibited several models and described a method of taking impressions. Have the wax in the impression-cup warm, then coat it over with a thin layer of plaster mixed to run freely. Press the impression-tray up posteriorly, thus bringing the flow of the plaster forward. In this way the soft parts on either side of the median line in the posterior part of the mouth will be forced up and held in that position during the setting of the plaster. A good wax impression is said to be better than a plaster one, because the wax forces the soft parts up and obviates the necessity of trimming the cast. The soft grade of modeling compound would answer even better than wax.

Dr. P. L. Stoddard, of Geneseo, said that it was well known that plaster expanded in setting, and when the cast of a mouth is taken the expansion causes the model to extend higher into the roof of the mouth. He doubted whether so good-fitting a plate could be made with a wax impression, because of the absence of this expansion.

Dr. Melotte said that in his experience there was little difficulty in getting a good fit with a wax impression.



Dr. F. A. Greene, of Geneva, said that the expansion of plaster models was responsible for many misfits in dental plates. His practice to avoid it was the mixing of marble-dust with the plaster. The roughness of the model caused by the marble-dust may be overcome by first pouring into the impression a little plaster for a surface, and then filling up with that which contains an admixture of marble-dust.

Dr. C. S. Butler, of Buffalo, said that misfits were more frequently due to the expansion and warping of the rubber in vulcanizing than to the expansion of the plaster model. Sometimes the expansion of the plaster will compensate the expansion of the rubber.

Dr. A. P. Southwick, of Buffalo, said that his remedy for the warping of rubber or celluloid plates was to preserve the model, and when the set is found not to fit in the mouth he puts it on the cast and forces it down, holding it over a lamp to heat it slightly, till it goes into the model correctly. The set will then fit the mouth.

Dr. C. T. Howard said that Dr. Requa had made of pure plaster a segment of a circle and vulcanized a piece of rubber in it. When vulcanized, the rubber was not the same shape as the model. He then made a like model of plaster and marble-dust, and the rubber when vulcanized exactly corresponded. Plaster in heating and cooling expands differently from rubber, while plaster and sand expand and contract the same as the rubber does.

Dr. M. B. Straight said that the expansion and contraction of rubber and the warping of the plates depended somewhat upon the shape of the plate, and he did not think there was any way which would always enable one to avoid the trouble. The only recourse was to doctor the plates. Rubber is very elastic, and by heating a portion between the heels of the plate it can be pulled into shape by the hands.

Dr. S. C. Maxon, of Utica, read a paper on "The Care of the Eyes from a Dental Stand-point." He explained briefly the philosophy of the refraction of light; the philosophy of the phenomenon of vision; the errors of refraction as found in human eyes; the necessity for the correction of these errors, and the philosophy of the means by which this is accomplished; and also of what he considered a topic which should receive more attention than it does,—painful or imperfect vision from muscular insufficiency. He also explained the injury done to the eyes by the use of glasses too strong for the wearer, because with the strong glass comes the necessity for a near point, and with the near point, when the effort is prolonged, comes muscular fatigue of the internal recti muscles. The reason why a person may employ without fatigue a strong magnifying-glass with one eye while the other is closed is because that in the use of only

one eye no convergence is called for. Dr. Maxon claimed that no dentist can do himself justice as an operator unless he has an abundance of soft light in his operating-room, and that so directed and controlled as to do the least injury to his eyes. He considered a northern exposure the best. He spoke also of the importance of a proper color of paper on the office walls, because in those instants of time in which one looks from the point of operation with the view of resting the accommodation and convergence of the eyes, if the paper reflects the light into the eye its brightness will produce a contraction of the pupil, and there exists an association between the contraction of the pupil and the power of accommodation and convergence; so that when one of these functions is brought into operation the others are excited in harmony with their associated functions, thereby defeating the object attempted. If, on the other hand, when the eye seeks momentary rest, it looks upon a non-reflecting surface, no functional activity is excited and the eye finds the rest it seeks. The same result may be obtained by a screen of dark color properly placed.

#### *Discussion.*

Dr. C. S. Butler said that dentists should be exceedingly careful to get the best light, and it was necessary to determine whether the north, south, east, or west light is best for the operating-room and for the laboratory as well. Our eyes are often injured by poor light in the laboratory, as many dentists seem to think the situation of the laboratory is a matter of minor importance; but the health may be endangered by an inconvenient and unfit laboratory as surely as by a poorly lighted operating-room.

The strain on the eyes may be lessened by the use of mouth-mirrors, which also enable one to maintain an upright position, thus relieving the strain on the back while working by reflected light. When the eyes need the help which properly selected glasses would give, the relief should be afforded them at once, or not only will the eyes be still further injured, but the physical condition will be impaired. He had had a personal experience of this character. Astigmatic eyes caused a nervous strain which seriously affected his health before he knew what was the matter. He was entirely relieved by the use of glasses.

Dr. Low asked Dr. Maxon the normal distance for near vision.

Dr. Maxon. About eighteen inches.

Dr. Low. Then, as the dentist naturally works with his eyes closer than that to his work, should he not wear glasses to assist the muscles of accommodation even if his vision was normal?

Dr. Maxon said that properly selected glasses might relieve the

eye in such cases, but if the eye is normal it will readily accommodate itself to the variations made in ordinary work, as it would be rested every time the work ceased for a moment.

Dr. Low said the wearing of glasses also shielded the eyes from particles of tartar which are liable to fly into them. He had had twice to visit an oculist to have pieces of tartar removed from his eye.

Dr. F. H. Lee, of Auburn, said he had worked in a north light for ten years, and had constant trouble with his eyes. For the last three years he had an east light, and finds it much less taxing.

Dr. I. C. Curtis, of Fulton, said that oculists tell us no color is so restful to the eye as green. For twenty years the walls of his operating-room have been green, and he attributes to this fact his present good eyesight.

Dr. H. A. Birdsall, of Buffalo, read a paper entitled "The Ethics of Professional Charges." [The paper and the discussion which followed are necessarily omitted for lack of space.—Ed. DENTAL COSMOS.]

Dr. F. A. Greene, of Geneva, read a paper entitled "Aluminium as a Base for Dental Plates." Dr. Greene spoke of the general distrust of aluminium, and of the fact that almost every one who had tried to work it had become too easily discouraged by a few failures. He claimed that there existed a prejudice against it founded on false representations as to its characteristics. He referred to what was said of it in the "American System of Dentistry," in which it is said that an aluminium plate should be annealed repeatedly during the process of swaging; and that no salt must be used with the plaster, as it would destroy the metal in a few hours; and that aluminium cannot be burnished. Although the writer of the article in the American System claims to have had an experience of more than twenty years with aluminium, it is easily proven that his conclusions in each of the three points named are erroneous. The speaker claimed to have a piece of the metal which had been kept in a saturated solution of salt for nearly ten months without any perceptible change. As to the necessity for annealing while swaging, he claimed that nearly all the failures were caused by annealing. One cannot be sure that the surfaces of the plate have been entirely freed from particles of zinc or lead adhering to them from the swaging process; and by annealing after beginning to swage, if there are any particles of zinc or lead upon the plate they become fused and make points for galvanic action. When annealing the metal for a plate, clean the surfaces thoroughly with a brush-wheel and pumice-stone, then coat the surface with a vegetable oil (preferably sweet oil), and pass it through the flame of a lamp until the oil is burned off and the metal has resumed its original color.



In swaging, use zinc and lead for die and counter, the same as for gold. Never strike the metal with the mallet. Use a piece of pine stick, letting the end rest upon the surface to be swaged, and striking upon that. This will avoid bruising the plate and also tearing it. By allowing the stick to slide in the direction you want it to go, you can force it in place with hardly any stretching. In this manner the plate can be swaged to so near a fit that two or three blows of the hammer will be sufficient to complete the operation. Before proceeding further, the plate must be thoroughly cleaned with a pine stick and pumice-stone of all particles of zinc or lead that may have adhered to its surface, taking special pains with those points where the die may have bruised it. The only practical way of attaching the teeth to the plate seems to be with rubber. In finishing, use first pumice-stone on a brush-wheel and follow with whiting on a polishing-wheel. The plate can now be burnished by using a good bloodstone burnisher and a good solution of soap. It will not do to use a steel burnisher.

He has made plates by this method which have been doing good service for six years, and in that time has had but one failure.

The advantages of aluminium as a base are its extreme lightness,—only one-eighth the weight of gold; its malleability, swaging without springing back; its conductivity of thermal changes, and its cheapness. Even if a plate would not last more than three years, it is far ahead of rubber, and will not disgrace the profession as rubber has done. Good results need not be anticipated unless the aluminium be absolutely pure.

Dr. S. B. Palmer, of Syracuse, said he had but little experience in making plates of aluminium, but had been wearing a plate of that material for sixteen years. One advantage aluminium has over any other metal as a base is the absence of any unpleasant effect from contact with other metals in the mouth. The plate does not corrode a particle in the fluids of the mouth. A plate made by Dr. Carroll for the speaker last year, at Syracuse, was found not to fit on account of contraction of the casting, and though he had altered it he could not make it comfortable, and had laid it by and resumed the old plate.

Dr. J. G. Templeton, of Pittsburg, Pa., thought that swaged plates of aluminium were better than cast plates. It is important to keep lead and zinc away from aluminium, for if a particle of either of these metals adhere to the aluminium there will be a perforation of the plate at that point. He said he was indebted to Dr. George Sitherwood, of Bloomington, Ill., for his method of swaging aluminium plates; he swaged them between sheets of silk tissue-paper, putting a sheet of the paper each side of the plate and renewing the paper frequently,

so as not to punch holes through it. In vulcanizing, the plaster must not be allowed to come in contact with the aluminium. This can be managed by coating the plate with sandarac varnish before it is invested, and when it is invested the plaster covers all the surface except that portion covered with wax, so that when separated no portion of the plate shows except that which has been covered with wax.

He does not use loops, staples, or pins, or punch holes in the plate, but simply washes the surface clean, first with soap and water and then with alcohol. Afterward he scratches it all over with sand-paper, taking care not to touch the surface with his fingers, nor even to permit his breath to touch it. Then with a sharp point he scores it all over lengthwise and crosswise, and it is ready for the rubber. The best rubber to be placed in contact with the plate is bow-spring rubber, spread thinly on the surface. He then generally uses the pink rubber of The S. S. White Dental Mfg. Co. He considers that it is quite as much trouble to make an aluminium plate as a gold plate, and the charge ought to be nearly as much.

Dr. Straight said the chief fault to be found with aluminium is its lack of elasticity. This is a serious fault, especially where the occlusion is flaring. In such a mouth the strain of mastication will force the plate out, and as it has no elasticity it will not spring back like a plate of any other metal would. In 1868 he made several plates, some of which stretched in three days' wear so that the fit was spoiled. Of course by using heavier plates more strength and stiffness would be secured; but except in the best mouths they will fail shortly, because of the absence of elasticity.

Subject passed.

Dr. I. C. Curtis, of Fulton, read a paper entitled "Treatment of Pulpless Teeth." He emphasized the necessity of eliminating all septic material, of making a free opening into the pulp-chamber in line with the axes of the root-canals, of reaming the canals with proper-sized Gates-Glidden drills, of syringing the cavity during the operation with a 1-1000 solution of bichloride, and subsequently with peroxide of hydrogen. He inserts a pin of hickory wood one-half the diameter of the nerve-canal, and long enough to protrude into the pulp-chamber so as to be grasped with tweezers for removal, pins to be saturated with creasote and the cavity sealed with gutta-percha for several days. In some cases, as, for instance, the incisors, he uses a tent of cotton or bibulous paper saturated with creasote, because more readily removable. This treatment for teeth in which there is no apparent inflammation.

Where there is considerable inflammation, as a preliminary he places a silk ligature around the tooth, leaving the ends a foot long, and directs the patient to lift the tooth by this ligature and so

modify the pain. In such cases he does not drill out the nerve-canals at the first sitting, simply removing as much as practicable of the putrescent pulp. He applies counter-irritants and not alcoholic fomentations, depletes if necessary, and thus brings the tooth into such condition that the treatment before described can be resorted to.

With teeth that are fistulous he excavates ready for filling, disinfects with bichlorides, and forces peroxide of hydrogen through the root with a hypodermic syringe as long as bubbles appear, and then fills canal and cavity at the same sitting.

In cases of what are termed "blind abscesses" he cuts through the tissues over the apex of the root with a sharp bur, breaking up the sac, and if any roughness is found on the end of the root excises it, and syringes with peroxide of hydrogen, forcing it out through the artificial fistula.

For permanent filling he uses chlora-percha, of the consistency of thin cream, pumped into the nerve-canals and forced to the apex with a gutta-percha point that had previously been fitted to the canal. He fills the pulp-chamber entirely with gutta-percha, and the cavity of decay according to circumstances.

Dr. C. T. Howard, of Rochester, followed in approval of the paper and indorsement of the methods recommended.

Dr. S. B. Palmer, of Syracuse, made a report of the meeting of the Massachusetts Dental Society held in Boston in June. A feature of the meeting which was recommended for adoption was a clinical conference which met each day for the benefit of those who wished advice in difficult cases. The remainder of the report was devoted to a description of exhibits of various tools and appliances which may be bought outside of dental depots.

Dr. W. H. Atkinson, of New York, said he had attended the meeting, and that so far as the exhibition of instruments and goods was concerned it was a success, but as an exhibition of professional learning and science it was not so much to be commended. The chief benefits to be derived from dental society gatherings was not information as to the prices of outfits, but mental stimulus and increased knowledge as to improved processes and new investigations in the field of dentistry. There was much more to be gained by true professional intercourse and exchange of thought than by searching out the cheapest places to buy dental goods. He had noticed that those men who inveigh most loudly against what they term a monopoly are the very ones who if they should invent anything would patent it and expect to sell the patent for more than the profits of the manufacture would amount to during the life of the patent. The effort to procure cheap goods does not always work to our advantage.



Dr. C. S. Butler, of Buffalo, called attention to one feature of the Boston meeting to which no allusion had been made by Drs. Palmer or Atkinson, nor had he seen any notice of it whatever in the journals. Dr. Crouse had made an able presentation of the claims of the Dental Protective Association, and of the benefit which would result to the profession from its work. On the following day Dr. J. T. Codman, of Boston, made a very forcible presentation of the benefits of patents to the people at large and to dentists and of the rights of patentees. Dr. Teague, of South Carolina, said he could see no reason why the protection and encouragement of the patent laws should not be availed of by dentists. He advocated a clause in the constitution permitting members to take out patents.

Dr. G. V. Emens, of Fulton, read a paper on copper amalgam. He places this material first as a tooth-preserver of soft, chalky, decalcified teeth. He thinks a copper amalgam should be composed of chemically pure copper and redistilled mercury without a trace of any other metal, and be so combined that there should be no necessity of removing an excess of mercury in preparing it for the cavity. Great care should be used in heating. Better results are secured when it is exposed to a slow heat. It should never be heated until it turns blue or brown. When sufficiently softened, place in a mortar that has been previously heated to about 110°, crush and triturate thoroughly, after which manipulate it with the fingers lightly and rapidly in the palm of the hand; then place the material in the warm mortar and use warm instruments for packing, having first used warm air for drying the cavity, if practicable. When full, smooth off with wet bibulous paper and leave the polishing for a subsequent sitting. He sometimes caps the copper with gold, and knows of no objection to the practice. Of late he has been adding gold to the filling while soft by rubbing No. 4 cohesive gold foil into it with a hot burnisher, being careful not to have more than one thickness of foil under the burnisher at one time. Such fillings retain their color, but do not receive as fine a finish or have as much edge-strength as the copper alone. When using copper amalgam he does not use varnish on the interior of cavities, as he believes the chief virtue of copper amalgam is in the formation of an oxide or a sulphide, either of which is an excellent and durable antiseptic. For this reason the pulp will tolerate its near presence better than that of any other alloy; it is also less susceptible to thermal changes.

Dr. E. C. Rishell, of Athens, Pa., believes that all amalgams are germicides, and are the best filling-materials that we have for the preservation of the teeth. When the only object is to stop the progress of decay, amalgam has an advantage over all other filling-

materials. Gold fillings arrest decay by the exclusion of the fluids of the mouth from the cavity; amalgam arrests it by a chemical action which may even depend upon the admission of those fluids.

Dr. C. S. Beck advocated gold as the most beautiful filling-material and the one that gives the greatest satisfaction to patients. One great objection to amalgam is that it encourages slovenly work.

Dr. J. G. Templeton acknowledged that amalgam preserved tooth-structure, but it had so many faults and had done so much to degrade dentistry that he preferred not to use it, and, in fact, did use very little of it.

Dr. A. P. Burkhart, of Dansville, believed that the intelligent use of amalgam would save more teeth than could be saved with gold. We should not forget that our business is to preserve the teeth, not merely to make fine-looking gold fillings.

Dr. Emens said that his claim for amalgam was that under certain conditions it preserved teeth better than gold. In Germany four-fifths of the fillings are of copper amalgam, and they are generally satisfactory so far as their usefulness is concerned.

Dr. F. H. Lee, of Auburn, read a paper on "The Use of the Matrix in Filling Teeth." Dr. Lee gave a description of the characteristics and special uses of several of the varieties of matrices on the market, but claimed that there are many times when the ingenuity of the operator will be required to devise something for the special case in hand. A simple and useful clasp-matrix can be quickly made from any thin metal, preferably German silver, as it reflects the light. It should be 26-gauge, bent to fit the tooth and cut to fit the festoon of the gum, with an ear on the outer edge to prevent its impinging on the gum. This matrix can be satisfactorily held in either of two ways: one the method of Dr. J. A. Woodward, described in the DENTAL COSMOS, 1885, page 335, consists in cutting longitudinal grooves on the back of the matrix to act as guides to the wedges; the other method is by the use of the Perry separator, which is perhaps the simplest, quickest, and best way of securing the matrix firmly in place. Figs. 1 and 2 show the two methods. An advantage secured by this separator is that at any time during the operation the space can be immediately widened and the matrix spread by condensing the gold more firmly against it, thus permitting an increase of contour. When the rubber-dam is used, the matrix may be removed and the edges of the filling be examined before replacing the matrix.

FIG. 1.

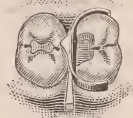
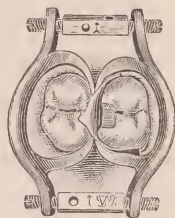


FIG. 2.



After final removal of the matrix, the separator can be applied and sufficient space gained for finishing. The filling should be commenced with large pieces of soft gold. He usually employs soft gold until about two-thirds of the cavity is filled, and finishes with cohesive. The flexibility of the matrix will allow the soft gold to come over the edges, leaving a surplus for finishing. He considers the matrix even more valuable in the use of plastics than with gold. An amalgam contour can be made and the matrix be left in place until another sitting for finishing.

Dr. C. S. Beck, of Wilkes-Barre, Pa., said he used matrices in nearly all approximal surfaces to be filled either with gold or amalgam. Their use lessens the sacrifice of tooth-structure in such cases. He thinks that only soft gold should be used with matrices; generally makes his own matrices of German silver, making the contour with contouring pliers.

Dr. J. G. Templeton said that a very good form of matrix could be made from a piece of a thin saw. Cut one edge concave, the other convex; pass a bolt through the ends, and the concave edge will hug the cervical part of the tooth and the other edge will open and allow plenty of room to insert the filling.

Subject passed.

Dr. A. Retter, of Utica, read a paper entitled "Treatment of Teeth having Foul Pulps."\*

Dr. W. H. Atkinson said that he found nothing to criticise in this paper. He would only advise that it be printed and the members take it home and study it as the best paper on this subject ever read in a dental convention. The treatment laid down met his fullest approval.

Dr. Low asked Dr. Atkinson, if peroxide of hydrogen is injected into a tooth and penetrates the tubuli so as to bleach the tooth and certainly kill all germs and render all septic matter harmless, why it is necessary to follow with bichloride of mercury and hot air and then close up the canals. Would not the peroxide of hydrogen suffice without all the rest of these remedies?

Dr. Atkinson said it is easy to ask "why," but he did not know any living man who could tell the why for anything. The idea of stopping when you have done enough is excellent. If the proposition is true that the peroxide of hydrogen has already killed the germs, all you need do is to dry out the cavity and seal it up. Albumen is not coagulated by bichloride of mercury in the strength we use it. A solution of one to five hundred will not do it, nor one to four hundred, nor one to two hundred; the assumption that it does so is

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\* See page 933 of current issue.



a mistake. The proper preparation of bichloride of mercury is one grain to the ounce of water. When you want the best possible disinfectant, put one grain of bichloride of mercury in an ounce of peroxide of hydrogen. This mixture, used till the tooth is thoroughly bleached, is the most reliable germicide in his knowledge.

Subject passed.

Dr. W. A. White, of Phelps, read a paper on "Conventions and their Benefits," in which he endeavored to illustrate the value, especially to the younger members, of association meetings over any other form of educational influence.

Dr. Templeton spoke of the use of sulphate of copper for suppurating teeth. At first he had tried solutions of different strengths, but now uses the pure powdered sulphate, and considers this the best form. It is a stimulant, astringent, and caustic. His method of applying it is upon a stick of pine wood, wet, and then dipped into the powder and applied thoroughly to the diseased parts. He directs the patient to eject the saliva and then rinse the mouth with tincture of wintergreen. If an astringent wash is needed, he uses tincture of krameria. Disapproves of the use of tincture of myrrh, because of the deposit which it leaves on the teeth.

Dr. Templeton then described his method of obtaining a correct bite and transferring it to the articulator, on which he formed a supplemental guide for the purpose of aiding in a correct arrangement of the artificial teeth. He illustrated the method by models, without cuts of which an intelligible description would be difficult.

Dr. George B. Snow gave a talk upon vulcanizers and vulcanizing. In discussing the relative merits of the steam-pressure gauge and the thermometer as indicators of the rise of the heat in the vulcanizer, he gave preference in general terms to the pressure-gauge, but said that as it was liable to get out of order the thermometer would be more generally useful for the dentist, and that the mercury-bath thermometer was to be preferred to any other. The dentist, however, must not rely too implicitly upon either the thermometer or safety-gauge, but must have an intelligent supervision of them occasionally, to assure himself they are in order. Sometimes the mercury escapes from the mercury-bath of the thermometer because of leaky packing, and then the thermometer is useless. When the vulcanizer is heated up quickly, the thermometer will often register fifteen degrees or so less than the temperature in the vulcanizer, because the heat takes some time to get through the cap of the vulcanizer, while of course the pressure increases as fast as the heat is raised. The safety-disk on a vulcanizer is of considerable importance, though sometimes dentists do not think so, and replace it with a disk that will not be blown off. The safety-

disk is a thin copper disk laid over the stud and a washer put over it. They are so constructed that they will not blow off at less than two hundred pounds' pressure, nor will they withstand over three hundred. When they are furnished to blow off at less than two hundred pounds there will be frequent complaints of their blowing out, which shows that many dentists work with higher pressure than they have any idea of. Safety-plugs are unreliable, because in time they become incrustated and will not melt at the same temperature they would originally; the heat does not affect them through the crust of oxidation.

Dentists should occasionally examine their vulcanizers, as they corrode and become thin; this can be discovered by tapping lightly with a small hammer. The corrosion usually takes place at the water-line, and if continued in use the pot will bulge out in the middle like a barrel. He exhibited one which was bulged as he described, and the bottom swelled out till it was almost a hemisphere. It was almost miraculous that it had not exploded. He said that rubber shrinks considerably in vulcanizing, and advised dentists who were making very thick plates to fill in the thickest parts with old vulcanized rubber which had already had the shrinkage taken out of it. Vulcanized rubber also shrinks from cooling, sometimes sufficiently to cause the plate to rock and make a bad fit. The way to remedy this is to heat a small portion of the plate in the palatal part over the spirit-lamp until it is quite soft, and then stretch it apart, and while holding it apart suddenly dip in cold water. The contraction of rubber in cooling is about six times the contraction of iron.

Subject passed.

A paper of Dr. W. F. Arnold, of Rochester, on "Foundation Principles in Dentistry," was read by title.

Dr. E. A. Freeman read a paper by Dr. G. H. Butler, Skaneateles, entitled "The Finishing of Fillings." He thought it was important to finish a filling before the removal of the rubber-dam, for several reasons: the polishing strips or disks cut better when dry; the sight of the work is not obstructed by fluids, and the rubber is a protection to the lips of the patient. When the separator has been used, the teeth should not be allowed to come together before properly contouring the gold; nothing must be allowed to prevent perfect finishing at the cervical wall. He thought many fillings were spoiled by the use of the sand-paper disks, which cut so rapidly that the contour is destroyed before the operator is aware of it. On the other hand, care should be taken not to leave the contour too full so as to cause unnatural pressure on the adjoining teeth. Great care should be used in the removal of feather-edges, which, if allowed to remain,

break off, leaving a shoulder upon the filling, and for this purpose he recommended the finishers designed by Dr. M. L. Rhein. He thought the frequent use of the burnisher while finishing good practice, and that a burnished surface is the best for proximal fillings. Amalgam should be used hard enough to take a finish at the time of insertion, and feather-edges should be avoided with this material more than with gold, on account of its greater brittleness. He thought a piece of wet cotton used to make the final finish to a moderately hard amalgam filling gives a satisfactory edge and surface. A piece of cotton drawn out small at one end and twisted slightly will slip between the teeth, then drawing the large end through will leave a smooth surface and remove the crumbs of amalgam. The use of pumice on a soft rubber wheel seems to leave the best edge in finishing a filling after it becomes hard. The borders of an amalgam filling will be better if the burnisher is not employed for a final finish, and on no account should this instrument be employed on the edges of a filling which is not thoroughly hardened.

Cement fillings will have a more durable surface if shaped and finished before granulation commences, keeping the surface dry until thoroughly hardened. In working gutta-percha, the use of chloroform to smooth the surface is detrimental, and any finishing had better be done while the material is dry.

Dr. Beck said he preferred the use of fine knife-edge files to disks to dress into shape, and strips of crocus and emery to polish with, but divides the strips so as to make them narrower than the depots furnish them. We must be careful not to let any gold extend over the cervical wall, as the overlapping margin will turn up and make a rough edge which will hold food and provoke decay. Dr. Webb always carried the margin of the cavity under the edge of the gum; and this is good practice, as the gum protects the filling. In finishing fillings, do not chop the surface, but use, first, steel and then agate burnishers, which will leave a hard, smooth surface; then with sand-paper dress along the cervical wall, and with a very fine sickle-shaped instrument trim off any surplus of gold. This will leave a fine, hard margin.

The convention adjourned to meet next year at Rochester, N. Y.

### INTERNATIONAL DENTAL CONGRESS.

THE first meeting of the International Dental Congress was held at the Palace of the Trocadero, in Paris, under the presidency of Dr. Gariel, professor of the Paris Faculty of Medicine, on Monday, September 2, 1889, at 9 A.M.

Over four hundred members were present at the opening session.



The opening address was delivered by Professor Gariel, in the name of the French government, which he represented. He was followed by Dr. David, president of the organizing committee, who gave a short history of the contribution of French dental practitioners to dental science.

The following were elected officers of the congress: President, G. Gaillard, M.D.; Vice-Presidents, MM. Poinat and Saussine; Secretary-General, Dr. Pourchet; Secretaries, Dr. Blocman, M. Godon, D.E.D.P.;\* Treasurer, M. Kuhn, M.D.

Dr. Gaillard thanked the members of the congress for the honor conferred upon him; he also referred concisely to the division still existing between members of the dental profession in France, hoping that the congress would prove to be a field of reconciliation. The congress then adjourned until afternoon.

To facilitate the discussion of papers, the congress was divided into four sections:

I. Dental Anatomy and Physiology—Normal and Pathological.

II. Operative Dentistry, Special Materia Medica and Therapeutics.

III. Prosthetic and Orthopedic Dentistry.

IV. Dental Deontology and Hygiene.

The following is a synopsis of the papers which were presented.

Paul Dubois, D.E.D.P., from Paris, read a paper on "The Teeth of Frenchmen." It was an interesting statistical study of the number of cases of exemptions from military service, on account of deficiency of the dental organs, in the French army from 1850 to 1886. As is well known, the French military law requires that every citizen who is twenty years of age must serve a term of three years in the regular army, unless he suffers from some physical deformity. Among the reasons for exemption is the loss of the incisor teeth by caries or otherwise. In his statistics, M. Dubois draws attention to the great difference which exists between the number of exempted persons in different districts. For instance, he finds, taking the two extremes, that in the department of the Puy de Dôme, out of 100,000 young men who were examined by the military medical commissioners, only 40 were exempted from military duties on account of deficiency in their dental organs; while in the department of the Seine Inférieure, which is about four hundred miles distant from the first-named district, out of 100,000 examined, 5129 were rejected on account of defective teeth. These two districts are inhabited by people of entirely different origin; and the author has found that inhabitants descended from the same ancestors, although separated and inhabiting a different district,

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\* D.E.D.P., Graduate of the Paris Dental School.

present about the same percentage of dental deformities or lesions. These observations confirm the researches and opinion of Dr. Magitot, in regard to the great importance to be attached to the ethnic origin of caries of teeth.

Richard Chauvin, D.E.D.P., and M. Papat, D.E.D.P., from Paris, read a communication on "Inflammations of the Gums: their Classification, Therapeutics, and Pathological Consequences." From this very long and interesting paper the authors conclude:

That inflammations of the gums, except those of specific and toxic character, are always of traumatic origin; that the almost unique cause is the action of tartar, and that the gravity of the disease depends on the precise way in which this is deposited. Those forms of inflammation of the gums which are of slow progress, medium severity, or hardly noticeable, are always produced by concentrated but regular and superficial deposits.

On the contrary, inflammations of the gums which run a rapid course and present severe local symptoms have always for origin deeply-seated calculary deposits which are irregularly distributed over the cementum. This irregularity and the roughness which is its consequence explains the continuous irritation produced, the local abrasions of the gums, and the inflammation of the soft parts around the irritating foreign body, which is always observed in severe cases.

The authors also assert that toxic and specific inflammations of the gums are sooner manifest and are more severe when tartar is present; and the affection is more likely to pass from a chronic, almost unnoticeable inflammation into a more acute form. Moreover, that in certain cases a patient would bear without inconvenience a dose of mercury which would develop toxic inflammation where a previous traumatic irritation of the gums existed; that inflammation of the gums may seriously affect the general health of the patient—may even cause death; that the treatment must first be surgical and include a thorough cleansing of the teeth, leaving not a particle of tartar to keep up irritation and inflammation; that the surgical therapeutics shall, if necessary, be destructive in character, by the use of thermo- or galvano-cautery in fungous and hypertrophied states of the gums; that a physician consulted in a case of inflammation of the gums should, even if the inflammation be due to a constitutional cause or of toxic origin, secure for his patient the assistance of a dentist to facilitate, by local remedies, the effects of the general treatment; that the local treatment should always be antiseptic in character, because the continual traumatism results in sphacelus of the soft tissues, sometimes osteitis or necrosis, the decomposition of the tissues rendering the buccal cavity highly septic.

M. Poincot, from Paris, read a short paper on the washing of

amalgam before introduction into the cavity. The formula recommended is the following:

Petroleum, 100 grammes;  
Ammonia, 10 grammes;  
Chloride of zinc, 5 grammes;  
Saponine, 1 gramme.

He claims that a great quantity of metallic oxides are extracted from the best amalgams by this method.

Arthur C. Hugenschmidt, M.D., D.D.S., from Paris, read a paper on "Herpes Zoster of the Mouth and Gums," which he has observed in two instances. The first case was a lady, aged fifty, who came to consult him on account of a severe neuralgia of the right side of the face, within the region supplied by the fifth nerve. For three consecutive days the patient had had marked fever in the evening, accompanied by neuralgia of the whole fifth nerve. On the fourth day the neuralgia located itself in the region supplied by the superior maxillary nerve; the pain was of a very severe type. On examination of the buccal cavity, the teeth of the superior maxillary were in a perfect state; but on trying to separate the cheeks from the external surface of the teeth the patient complained of severe pain. There was then noticed on the inner surface of the cheek an agglomeration of small herpetic vesicles, the size of a pin's head, extending under the form of a band for about one inch and a half in length and one-half inch broad in a parallel direction to a line joining the necks of the teeth; this eruption was very painful to the touch. Notwithstanding all treatment, the pain persisted for nearly one month, and disappeared with the eruption.

Four years after, this spring, another case was observed. A young lady, aged twenty-two, presented, suffering from neuralgia of the right side of the head, accompanied by high fever. For three days the pain was general, then located in the lower maxillary nerve. No dental lesions were observed; but on the gums of the lower right maxillary, about one-half inch below the neck of the teeth, one could see a band of herpetic vesicles extending from the right lower cuspid to the second molar. The pain in this case persisted for over three weeks, and the fever in addition always remained very high; this disease being followed by a very severe type of pneumonia.

The treatment consists in protecting the eruption from friction by placing a little pad of cotton, with some calming preparation, on the involved part. The preparation used was as follows:

Muriate of cocaine,  
Muriate of morphine, *aa* gr. ii;  
Borate of soda,  $\mathfrak{z}$  i;  
Honey,  $\mathfrak{z}$  i. M.



Antipyrine was given internally as an analgesic, and the arseniate of iron as a tonic.

From these two observations of a comparatively rare location of this disease Dr. Hugenschmidt draws the following conclusions:

Herpes zoster, or zona, of the mouth presents itself with all the symptoms of a general disease. It is an inflammatory affection of one part and *only one side* of the buccal cavity, characterized by an eruption of herpetic vesicles disposed in groups according to a regular direction. The eruption is preceded and accompanied by a neuralgic pain of the whole fifth nerve.

The evolution of the disease can be divided into two periods: 1, the period of invasion; 2, the period of eruption.

1. The period of invasion begins by a rise of the temperature: there is fever; general symptoms then appear, headache, nausea, loss of appetite, etc.; then an intense neuralgia of the whole region of the fifth nerve. The fever lasts three days, and is followed by the period of eruption.

2 In the period of eruption the parts to be involved become excessively painful to the touch, the mucous membrane is red and presents a series of little herpetic vesicles disposed in groups and having the size of a pin's head; some of them are united; they assume a regular direction, usually the course of the nerve (in the first case it ran along the course of the buccal branch of the inferior maxillary nerve; and in the second case also along a filament of the same nerve). No vesicles are to be found disseminated in the mouth. The neuralgia, which is general for the first three days, localizes itself as soon as the eruption occurs.

The local lesions are attributed to trophic changes due to a neuritis of the nerve supplying the involved parts.

The only two diseases of the mouth for which it may be mistaken (and then only in the early stage, for later, when the eruption is complete, no confusion is possible) are herpetic stomatitis and aphthous stomatitis.

With herpetic stomatitis we usually have herpetic angina; moreover, the herpetic vesicles are disseminated irregularly on both sides of the buccal cavity; in zona, only one side is involved. Aphthous stomatitis, described by Dr. Charles David at the International Congress of Washington, also presents with fever, but the local pains are disseminated, and no neuralgia is present.

T. Franck, M.D., from Vienna (Austria), read a paper on the "Suppression of Hemorrhage following the Extraction of Teeth in Hemophilic Patients." The author first describes the difficulties which are encountered in attempting to suppress a secondary hemorrhage after the extraction of teeth in these cases. As most of

those hemorrhages take place five or six hours after the operation, we find that patients always try first all sorts of remedies themselves before returning to the specialist. When they do appear it is in a feeble state, the expression is pallid, they speak with difficulty, and easily faint. The bleeding alveolus presents an ugly aspect; detached pieces of coagulated blood cover the wound, and between its meshes blood is seen to ooze; if the coagula are taken away, we find the gums covered with crusts, more or less adherent, produced generally by perchloride of iron which has been employed. The blood then floods the buccal cavity.

The author discussed the different methods usually employed, disapproved of the use of any corrosive drug, and considered that plugging the alveolus should be resorted to only in cases of very severe hemorrhage, and will prove effective only when the cavity is large enough to retain the plug.

Dr. Franck recommends in cases of hemorrhage the application of the rubber-dam to the teeth which are immediately in contact on each side with the bleeding alveolus; this manner of compression is much less disagreeable than the compression produced by obliging the patient to keep his jaws always together on the obturating plug, or than from bandaging the head, to keep the jaws in position. With the rubber-dam, which is kept on for twenty-four or forty-eight hours, the patient can take any amount of food necessary, which fact is of the highest importance in the treatment of such subjects.

Moreover, the specialist must not forget that after a severe secondary hemorrhage the general feeble condition of the patient requires nourishing food and tonic treatment.

R. Heidé, D.E.D.P., from Paris, read a communication "On the Filling of Teeth with Pieces of Enamel derived from Natural Teeth." The author says that for several years past attempts have been made to find substances which would at the same time approach the color of the tooth and preserve it from caries; a substance which would not contract, nor wear, nor be attacked by the acid fluids of the mouth.

For the past four years the author has used fragments of natural enamel for the filling of cavities in anterior teeth; the results obtained have been very encouraging, the filling being much superior to any cement filling. The enamel pieces are, of course, to be prepared and adjusted in advance; to make them hold better in the cavity when fixed with cement, little side-faces are filed on each side.

The *modus operandi* is as follows:

1. Supposing one has to deal with a comparatively large caries in the median surface of a lateral incisor, the cavity is prepared as if

a cement filling was to be made, with a good cervical groove and one at the cutting-edge of the tooth. On another natural tooth a corresponding part is cut, so as to have the exact form; the labial border of the piece of enamel is filed straight, while the lingual border is beveled and is thus more easily retained.

2. On the labial surface of central incisors we find three sorts of cavities, round, oval, and square. As the form of the cavity ought always to be respected, the enamel piece is prepared to suit it. The round form we find more often on the eroded teeth; the square form is also found on the same teeth; as to the oval form, it is more often found at the cervical border or neck of the tooth.

3. Bicuspsids, first and second, are often affected by caries on their median surface, with extension to the masticating surface; in such cavities gold fillings are very apparent and are to be avoided if possible. In these cases the piece of enamel is given the shape of a shirt-stud, which causes it to be held very firmly. The cement is first introduced and the piece is carried into place with an instrument having a little wax at the end of it; the surface is then rounded even and polished as usual.

(To be continued.)

### BROOKLYN DENTAL SOCIETY.

At a regular meeting of the Brooklyn Dental Society, held October 28, 1889, the following resolution was passed:

*Resolved*, That the Brooklyn Dental Society indorse the Dental Protective Association of the United States, and recommend its members to join said association at once.

LOUIS SHAW, *Corresponding Secretary*.

### MASSACHUSETTS BOARD OF REGISTRATION IN DENTISTRY.

THE second annual meeting of the Massachusetts Board of Registration in Dentistry for the examination of candidates who wish to practice dentistry in said State will be held in Boston, Wednesday, December 4, 1889, at 11 A.M., at the office of Dr. L. D. Shepard, 100 Boylston street.

E. V. McLEOD, *Secretary*.

### D. D. S. SOCIETY OF THE PHILADELPHIA DENTAL COLLEGE.

At a meeting of the D. D. S. Society of the Philadelphia Dental College, held October 18, 1889, the following were elected officers for 1889 and 1890: F. O. Rhoads, president; F. H. Parker, vice-president; W. R. de Les Derniers, secretary; Frank J. Kennedy, treasurer.



### MARYLAND STATE DENTAL ASSOCIATION.

THE sixth annual meeting of the Maryland State Dental Association will be held in Baltimore, on Thursday and Friday, December 5 and 6, 1889.

The programme will consist of reports from committees, essays, clinics, and displays of dental specialties. Members of the dental profession are cordially invited.

D. F. PENINGTON, M.D., *Recording Secretary.*

### CONNECTICUT VALLEY DENTAL SOCIETY.

AT the annual meeting of the Connecticut Valley Dental Society held at Springfield, Mass., October 23 and 25, 1889, the following officers were elected for the ensuing year:

Dr. E. S. Gaylord, president; Dr. Geo. F. Harwood, first vice-president; Dr. W. H. Rider, second vice-president; Dr. Geo. A. Maxfield, secretary; Dr. S. S. Stowell, assistant secretary; Dr. W. F. Andrews, treasurer.

GEO. A. MAXFIELD, D.D.S., *Secretary,*  
Holyoke, Mass.

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## EDITORIAL.

### THE PUBLICATION OF SOCIETY PROCEEDINGS.

IN the discussion following the reading of Dr. Jack's paper before the American Dental Association, Dr. W. C. Barrett *is officially reported* as having said,—

"But I said that some of our leading societies had not given our journals a fair chance, and I know of none which has been a greater offender in this respect than the American Dental Association. What is its attitude to-day toward the journals? For the sake of saving a few pitiful dollars, it gives its treasures wholly and exclusively into the keeping of a dental supply house. It slams the doors in the faces of all its journals, and refuses to allow them access to the avenues of information. If the society has any excuse for existence, it is that it is engaged in the effort to disseminate professional information, and yet it deliberately closes up the legitimate channels through which such information must flow. Professing to keep in view the good of the whole body of dentists, it sells out to a house which is in the business the very knowledge which has been given for the good of the whole. . . . But I do not believe that this dirty work is the act of our best men. The politicians of the society have managed this matter, and, like other politicians, they are scarcely the best judges of what is the fit thing to do in a case of morals or of professional ethics. . . . As long as this society clings to its present position it is unworthy to consider the subject of dental literature, for it is doing its utmost to discourage the journals."

Dr. Barrett, according to the official report, continues in this strain for several pages: talks of "unjust discrimination against the journals," of a house which has "a monopoly of the brain-work done in this society," of placing "a premium on quackery by encouraging it among the journals," etc.

As such a presentation of the subject is liable to create a false impression, the following veritable history is submitted as due alike to the association, to the profession, and to the DENTAL COSMOS, which is published by "the supply house" referred to.

At the meeting held in Boston in 1880, the Publication Committee explained as the reason for the late appearance of the Transactions the fact that the treasury was empty, and it had not been deemed justifiable to commence printing until enough money was collected to insure the payment of the bills.

As a result of this report of the condition of the treasury, the following resolution was subsequently offered by Drs. Atkinson and Crouse:

*"Resolved, That the Publication Committee be instructed to confer with publishers to secure the best terms for the publication of the Transactions of this body, with authority to give such portion of the matter as the publishers may wish, as a part or as a full compensation, and that the Publication Committee have discretionary power to accept or reject any or all offers."*

At the next meeting of the association, held in New York in 1881, the Publication Committee submitted the following report:

"In accordance with the instructions of the association, they opened correspondence with different publishers regarding the printing of the Transactions; finally accepting the proposition of the trustees of S. S. White.

"Three hundred copies of Transactions were furnished the association, of which about two hundred and thirty-five copies have been duly distributed as per the treasurer's list, and to the various libraries, universities, journals, and honorary members.

"Of the character of the work done by the trustees of S. S. White, the volume speaks for itself; but the association cannot know how much it owes to these gentlemen, and particularly to Mr. Hise, who had charge of the publishing department.

"Without the very intelligent and diligent services they rendered, you could not have had so fine an edition of Transactions, while your editor and publishers were so widely separated.

"The committee feel that the warm thanks of the association are due to the gentlemen above named for the valuable services they have rendered."

The conditions under which the Proceedings are published, as per agreement with The S. S. White Dental Manufacturing Company, are as follows: two sets of proof are to be sent to the chairman of the Publication Committee for revision after careful correction by copy; all expense of transmission of papers, copy, and proofs to

be borne by the company; the paper, printing, and binding to be equal to a given standard; the cost of illustrating any paper requiring illustration to be borne by the company; no advertisements to be admitted; one copy to be furnished for each member of the association, and such additional copies—usually one hundred or one hundred and fifty—as the chairman of the Publication Committee may direct for other distribution.

Originally, the sole object in undertaking the publication of the Transactions by the "dental supply house" alluded to was to help the association out of its financial straits; and it asked and received no concession which was not granted to all dental journals. The association reserved all rights to its papers, and no journal was permitted to publish any paper in full previous to the issue of its Transactions. For two years the Transactions were published under this arrangement; then a single modification was made in the terms by which the DENTAL COSMOS was permitted to publish in advance such papers as it might elect to print in full. And to-day the only advantage which it holds over any other journal is the opportunity to publish a paper in full before the appearance of the Transactions. Any journal has and always has had the privilege of sending its reporter and of publishing reports of the papers and discussions, the papers being furnished by the secretary for reasonable abstracts, with the single condition that they were not to be printed in full. After publication of the Transactions they are, of course, free to all. In claiming ownership of its papers, the American Dental Association assumes that which the American Medical Association and scientific bodies in general do. The American Medical Association will not permit the publication of a paper until after it has been published in its official organ.

This single, simple advantage—permission of first publication—has cost the "dental supply house" aforesaid thousands of dollars; the actual expense of publishing the Proceedings of 1888 being over seven hundred dollars.

The money thus saved by the association has enabled it to offer prizes and to make appropriations for scientific work, as witness the prize money paid to Dr. W. D. Miller for his paper on "The Etiology of Dental Caries," the appropriation of five hundred dollars for the tabulation of skulls, and various appropriations to Sections for scientific research.

From Dr. Barrett's language one might infer that the society sold its Proceedings with the understanding that they were to be buried and hidden from the sight of man. The fact which any child can appreciate is that the Proceedings are not sold at all, but simply the right to publish them on certain well-defined conditions which year



after year the association had deemed advantageous to itself. It has done precisely what an author does who asks and receives bids for the publication of his works and elects from the bids received the one which he deems the most satisfactory. The purpose in both instances is to secure publication, not concealment. So far from doing its utmost to discourage the journals, refusing to allow them access to the avenues of information, slamming the door in their faces, etc., facilities have always been afforded for all who wished to report the proceedings, and have, without exception, been availed of at every session by one or more reporters for dental journals. Dr. Crouse, in reply to Dr. Barrett, affirmed that "any reporter can come here and make as full reports of these meetings as he sees fit," and added, "This high-flowing speech is all nonsense."

Dr. Barrett makes the claim that "no society has a right to sell for a moneyed or any other consideration that which is the property of the whole." Of the "whole" what? If the whole association is meant, that is the body which claims ownership of its papers, and that is the body which through its Publication Committee, as Dr. Crouse stated, "makes the best arrangement it can for the publication of its Transactions." If by the "whole" is meant the dental profession in general, it may be said that the association has probably selected the best plan which could have been devised for giving to the whole dental world the benefit of its proceedings.

Now, when the association tires of its alleged "dirty work" and desires to make other arrangements for the publication of its Transactions, it is within its legitimate province to do so; and surely the "dental supply house" which has done the work for the last ten years will have no right to complain, even though it should be willing to continue the arrangement.

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### THE AMERICAN DENTAL ASSOCIATION IN 1892.

IN the year 1892 the discovery of America by Columbus is to be commemorated by a celebration to take place somewhere within the United States of America, and to be participated in by invited representatives from other nations of America and of the world.

In common with various classes of our countrymen associated for the cultivation and promotion of objects immediately related to their special avocations, dentists are now considering the advisability of a meeting distinctively professional, and general to a degree which shall call together dentists of all nations.

A suggestive article by Dr. W. W. Allport in the *Dental Review* for October proposes that the American Dental Association provide that, at its session in 1892, all reputable *American* practitioners

(not delegates or permanent members) might be admitted on payment of a single year's dues; while all foreign dentists might be made the guests of the society, and, as such, would not be allowed to pay dues. He argues that if some such arrangement were carried out, and prominent home and foreign dentists were invited to contribute papers and to take part in the discussions, there is no doubt that at least one thousand American dentists would be in attendance, and that the association would be honored with the presence of a large number of foreign guests; and expresses the conviction that by the united action of the profession in this country (which by a little concession on the part of the few might be secured) the grandest and most instructive meeting of dentists that the world has ever known might be held.

The editor of the *Review*, in commenting upon the communication of Dr. Allport, digressively and also somewhat aggressively declares that "First and foremost is the evident tendency of the members of the dental section of the American Medical Association to control the American Dental Association and direct its policy." He says, "This tendency has been growing more steadily since 1883 or 1884 than in all the previous years of the existence of the association," and claims that "the efforts spent in this direction, if they had been directed to the more profitable channels of preparing papers and presentation of scientific work in the meetings of the association, would not now call for a 'memorial' meeting of the association in 1892."

The editor proceeds further along this line of discursive rather than discussive remarks until he ventures upon the prophetic utterance that "By the time 1892 rolls around a 'memorial' meeting of the American Dental Association will not be needed, for in its stead a *second International Dental Congress* will assemble in the United States, and the American Dental Association and every other dental society will, we hope, unite in calling for the largest gathering of dentists the world has ever seen, to discuss questions that will interest all classes of dentists, whether they hold M.D., D.D.S., L.D.S., M.D.S., D.M.D., or any other title than dentist."

In the nature of the case it would seem that the editorial remarks quoted are not germane to the subject as presented by Dr. Allport, whose suggestion is based upon the foundation facts that the celebration is to be primarily American and under distinctly American auspices and control. The suggestion is that dentists of all nations shall be invited, not however as delegates to a formal international organization in the nature of a congress. It seems therefore eminently fit and proper that the American Dental Association should assume the direction of a dental branch of the celebration of the

birthday of America, and we earnestly hope that the youngest of the professions and one by birthright distinctively American may look with confidence to the American Dental Association for an arrangement providing for a fitting celebration in 1892.

### SECTION WORK IN ASSOCIATIONS.

In a brief editorial in the *DENTAL COSMOS* for September relative to the recent meeting of the American Dental Association we used this language:

"The Sections had not made preparation at all adequate to that which had been accomplished for previous sessions, and, with one exception, and a single paper in another Section, there was little to indicate that due efforts had been made for a creditable presentation of the subjects embraced in the several departments assigned to the respective Sections."

An esteemed contemporary commenting upon this paragraph remarks, "This would seem to be throwing the blame of the failure of the meeting upon the chairmen and secretaries of the several Sections, which is not just."

The inference is not a fair deduction from the language employed, nor was any such meaning intended. It is not fair to assume that the failure of a Section is chargeable to its chairman and secretary. They indeed are important factors, but without the help which they have a right to expect from the members of their Section they ought not to be expected to present a creditable report.

The fact is that the Sections depend altogether too much upon the officers. Connection with one or more Sections is a discretionary matter, and every man who volunteers to become a member should feel under personal obligation to do his part toward a report which shall be creditable alike to himself, to his Section, and to the association. So long as members are willing to depend on the efforts of the chairmen and secretaries, so long will the reports fall short of the results aimed at in the creation of Sections.

Whether the Section plan is that best adapted for effective work or not is open to question; but while that method is pursued a sense of honor should compel the hearty co-operation of every member.

### MEDICAL EDUCATION.

FROM a reprint of the Yale University address in medicine by Professor H. C. Wood, of the University of Pennsylvania, we present the following extracts:

"The American medical profession has in it a multitude of rightly educated physicians, but it comprises also an enormous number who are but partially edu-



cated in their profession. Of all places in the universe,—in America there are doctors and doctors.

“The American medical profession cannot be in any degree held responsible for its condition, not merely because it has no power over its own members after they have entered, but especially because it has no control over the gates through which men flock into it. In some States, the law allows anyone to set up as a doctor who wishes; whilst where there is any law regulating the mode of entrance into the profession, such law usually puts the power of granting the right to practice into the hands of the medical college. To be sure the medical college is nominally required to examine the candidates and to shut out the unfit. Almost any small group of physicians can, however, constitute themselves a medical school, and conduct their examinations so privately that no outsiders can know whether these trials be substance or shadow. The national vice, the imperative desire to get on in the immediate present, fills the land with persons who wish to get the right to practice medicine at the lowest outlay in money, time, and labor. For these candidates the schools bid one against the other; and so the standard falls lower and lower; medical education becomes a farce, and the doors of entrance to practice stand wide open to anyone who can raise a few hundred dollars.

“At the recent examination for the Army Board, of thirty doctors who had been picked out from among the best graduates and had been especially prepared for the army examination, only two reached the required standard. I believe myself that not twenty per cent. of the graduates of medicine in America could pass the State examination required in Germany for license to practice. Humiliating though it be, yet it is true that an American medical diploma has in itself no meaning, and that it will never be a true certificate of technical knowledge and education until it is supplemented by the law.”

If such language can be appropriately used with reference to the medical profession, medical colleges, medical examinations, and medical diplomas, it suggests if it be not worth while for all concerned—practitioners, professors, students—to inquire how far it is applicable to existing facts in similar dental relations. “The national vice, the imperative desire to get on in the immediate present,” it is not unreasonable to suppose, is as potent in dentistry as in medicine, and unless sedulously guarded against the sequence will correspond,—the standard will fall lower and lower, and dental education become a farce.

### A BRIEF RÉSUMÉ.

IN the September issue of the *International Dental Journal* the editor took occasion to discuss the *motives* of the company publisher of the DENTAL COSMOS, and to gratuitously assign reasons of his own invention for the methods pursued in the conduct of this journal.

While we cheerfully acknowledge the right of any journal to comment on the course of a contemporary, we contend that such an

imputation of unworthy motives is in violation, not only of the ethics of polite journalism, but of the ordinary and accepted rules of civilized society,—is, in other words, unadulterated impudence.

We took occasion in the *DENTAL COSMOS* for October to counsel the editor aforesaid that success in journalism was not to be obtained by detraction and misrepresentation of his contemporaries, and advised him that he would be better engaged in attending to his own business than in meddling in that of his neighbors. In his November issue he claims that the article which we criticised was written from "an entirely *impersonal* point of view," and expresses surprise and regret at the tone of our rejoinder, which he considers *personal*, as we meant that he should. It is well understood in journalism that the person whose name appears as the editor of a periodical is personally responsible for its editorials, whether written by himself or by another. Therefore his objectionable utterances were not impersonal so far as the writer was concerned, and were certainly not impersonal as to the *Cosmos* and its publisher. The editor of the *International Journal* will not be likely to obscure the vision of others by throwing dust in his own eyes, nor to profit by his weak attempts to create prejudice by forced construction of language that had obvious meaning. The malicious and mischievous intent of both of the editorials referred to is evident. The wish is manifestly father of the thought that the profession will accept his perversions as just renderings. Perhaps it may; probably it will prefer to use its own common sense.

We close this controversy so far as we are concerned with the expression of our regret that the editor of the *International Journal* should have found it necessary to resort to such pettifoggery, taking leave to add that this commentary is not impersonal.

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#### AMERICAN ACADEMY OF MEDICINE.

THE American Academy of Medicine is endeavoring to make as complete a list as possible of the alumni of literary colleges, in the United States and Canada, who have received the degree of M.D. All recipients of both degrees, literary and medical, are requested to forward their names at once to Dr. R. J. Dunglison, secretary, 814 N. Sixteenth street, Philadelphia, Pa.

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#### INDEX TO VOLUME XXXI.

THE Topical Index for the thirty-first volume of the *DENTAL COSMOS*, ending with this number, is, we think, the most complete subject-index to any dental periodical which has ever been published.

By it the reader will be enabled to readily find the author or subject in every department of the Cosmos for the current year,—a facility of reference which we have no doubt will be duly appreciated by our subscribers. The usual monthly index to the number for December is omitted because thus rendered unnecessary.

### A NEW DRESS.

THE January number of the DENTAL COSMOS will make its appearance in new type, throughout both its reading and advertising pages,—a change which cannot but add to its attractiveness so far as its mechanical aspect is concerned.

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## BIBLIOGRAPHICAL.

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**DENTAL CHEMISTRY AND METALLURGY.** Being the Second Edition of the Dentist's Manual of Special Chemistry, revised, rewritten, and including: 1. Essentials of Chemistry for Dental Students. 2. General Chemistry for Dental Practitioners. 3. Laboratory Course in Elementary Chemistry for Dental Students. 4. Laboratory Course in Dental Chemistry and Metallurgy. By CLIFFORD MITCHELL, M.D. Octavo, pp. 393, and Glossary and Index. Chicago: W. T. Keener, 1890. Price, cloth, \$2.50.

That the study of chemistry excites but an indifferent interest on the part of a majority of students of both medicine and dentistry will perhaps not be gainsaid by anyone who has given careful attention to the matter. If this be taken as true, the fact is certainly a lamentable one in view of the immense importance which appertains to chemistry as an essential factor in nearly every department of our knowledge of both medicine and dentistry. An accurate knowledge of the fundamental principles of chemistry should be as much a part of the mental equipment of every dentist who would be something more than an empiric, as a knowledge of the multiplication table is of the mathematician's.

Failure upon the part of the student to acquire a proper working knowledge of the subject is in most instances due not to a want of attractiveness in the science itself, but too often to the manner of its presentation, which fails to excite any interest whatever when he is deluged with a mass of disconnected facts and data and is compelled to memorize them without a just appreciation of the *science* of chemistry, which is their orderly presentation and correlation.



The mind therefore becomes quickly wearied, and a state of confusion as to the entire subject results.

A work which will teach chemistry in such a manner that it may be learned logically—one which is clear in its statements so that no confusion exists as to the author's meaning, one which creates an interest in chemical science at the start and maintains it throughout, and especially adapted to the needs of the dental student and practitioner—has long been a desideratum. These requirements seem to be fully met in the work under consideration. The first edition of Prof. Mitchell's *Dental Chemistry* was welcomed as an attempt to meet a recognized need of the profession for a work of this character, but it fell short in some particulars which were noted in a review of the work which appeared in the *DENTAL COSMOS* at the time of its publication. The most important defect of the first edition, as it appeared to the reviewer at that time, was the lack of a full presentation of the laws governing chemical changes, etc.,—*i.e.*, the theoretical phase of the subject had not been sufficiently emphasized. In the second edition this has been fully rectified, and leaves nothing to be desired. A large section has been devoted to chemical philosophy, and the statements of the well-established laws—Boyle's, Avogadro's, etc., with their deductions—are models of clearness. The same may be said of the proposition by which the diatomic character of the hydrogen molecule is established, and of the method for determining atomic weights, etc., which are frequently stated in textbooks in a manner so confusing as to render an understanding of them difficult.

The work throughout bears evidence that it was written for the express purpose which its title indicates, and is replete with information which should be at the command of every dentist. The author is entitled to the thanks of the dental profession for putting into such accessible and attractive form so much valuable material which is not otherwise readily obtainable.

E. C. K.

CHEMISTRY: GENERAL, MEDICAL, AND PHARMACEUTICAL, INCLUDING THE CHEMISTRY OF THE U. S. PHARMACOPEIA. A Manual of the General Principles of the Science, and their Applications in Medicine and Pharmacy. By JOHN ATTFIELD, F.R.S. Twelfth edition. Octavo, pp. 770. Philadelphia: Lea Brothers & Co., 1889. Price, cloth, \$2.75; leather, \$3.25.

Twelve editions of a scientific work in twenty-two years is indicative of a popularity based on a recognition of its adaptation to the class it was meant to serve. The volume before us, intended especially to teach the general facts of chemistry to medical and pharmaceutical students, is as well a manual of applied chemistry, a reliable

guide in the experimental study of the science, and an admirable reference-book,—an index containing nearly nine thousand references being appended. The present edition includes the chemistry of the United States and British Pharmacopœias and a section on organic chemistry. Every substance in which physicians or pharmacists as such are interested is noticed at more or less length according to its importance. "Attfield's Chemistry" must be classed as among the indispensables to the students of that science.

TRANSACTIONS OF THE ODONTOLOGICAL SOCIETY OF PENNSYLVANIA for 1886, 1887, and 1888. One volume, octavo, pp. 325 and index.

We have here in neat cloth binding the official printed transactions of the Odontological Society of Pennsylvania for the years above named. Many of the papers and reports of discussions appeared in the DENTAL COSMOS soon after the holding of the meetings. Much space is occupied by a report of the tenth anniversary meeting of the society in December, 1888, and the important papers then read are liberally illustrated with plates and wood-cuts. Any inquiries in reference to the volume may be addressed to Dr. Ambler Tees, secretary of the society, No. 548 North Seventeenth street, Philadelphia, Pa.

ANNUAL OF THE UNIVERSAL MEDICAL SCIENCES: A Yearly Report of the Progress of the General Sanitary Sciences throughout the World. Edited by CHARLES E. SAJOUS, M.D., lecturer on laryngology and rhinology in Jefferson Medical College, Philadelphia, etc., and seventy associate editors, assisted by over two hundred corresponding editors, collaborators, and correspondents. Illustrated with chromo-lithographs, engravings, and maps. Royal octavo. Volumes I-V, 1889. F. A. Davis, publisher, Philadelphia, New York, and London. Price per set, cloth, \$15.00; half Russia, \$20.00.

The design and scope of this work was noticed in our pages on the reception of the first issue of the Annual, but the wonderful completeness of that as well as of the second issue now before us justifies the adoption of the original announcement of the object of the publication as only a modest statement of the accomplished fact,—"a report of the progress of every branch of medicine during the year in every part of the civilized globe." The work is really extraordinary in the degree of perfection attained.

In the department of oral surgery Dr. Garretson gives a résumé of contributions on tumors of the jaw, on diseases of the tongue, on nerve-exsections of the face, on affections of the salivary glands and their ducts, and on cocaine in oral surgery.

MAN AND HIS WORLD: or the Oneness of Now and Eternity. A Series of Imaginary Discourses between Socrates and Protagoras. By JOHN DARBY. 12mo, 259 pp. Philadelphia: J. B. Lippincott Co., 1889. Price \$1.00.

Although contrary to the rule which usually excludes notices of books which have no relation to subjects calculated to interest dentists as such, we make an exception in the present instance because of the position which the author (Prof. James E. Garretson) bears to dental education and the dental profession.

The volume, as its title indicates, is a philosophical-metaphysical disquisition upon God, Ego, Matter, Force, Nature, Mind, Soul, Eternity, and kindred topics, in which, as stated in the introduction, an "attempt is made, through an exhibit of the principles of things, to bring something of harmony out of the prevalent confusion of the times, and to reconcile the childish yet destructive differences that separate people of the various sects and systems."

We cannot devote space to further notice of the book, but feel assured that all who found pleasure and profit in the perusal of previous works of this general character by the author will gladly avail themselves of the opportunity to follow him in this later effort.

#### PAMPHLETS RECEIVED.

Transactions of the Indiana State Dental Association, at the thirty-first annual meeting, held at Indianapolis, Tuesday, June 25, 1889, continuing three days. Published for the association by Mrs. W. M. Herriott, Indianapolis, 1889.

The Medical Profession; the Medical Sects; the Law. The Address in Medicine, Yale University, 1889. By H. C. Wood, M.D., LL.D. (Yale), clinical professor of diseases of the nervous system in the University of Pennsylvania. Reprinted from the *New Englander and Yale Review* for August, 1889.

Deafness as a Result of Nasal and Dental Diseases. By D. H. Goodwillie, M.D. Reprinted from the *New York Medical Journal* for August 24, 1889.

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### OBITUARY.

#### DR. JOHN D. WINGATE.

DIED, at Carbondale, Pa., August 19, 1889, of heart-failure, JOHN D. WINGATE, D.D.S., in the sixty-eighth year of his age.

Dr. Wingate was born in Middleburg, Union County, Pa., December 26, 1821. He studied dentistry with Dr. J. D. White, and graduated from the Pennsylvania College of Dental Surgery in February, 1865. He practiced his profession in Bellefonte for nineteen years,



and subsequently at Carbondale up to the time of his death. Dr. Wingate had suffered for several years from heart-disease. He was found dead seated by his desk, having evidently passed away without a struggle.

Professionally, Dr. Wingate was highly esteemed. He took an active interest in public affairs, and the local papers speak of him as one of the most prominent and progressive residents of Carbondale. He leaves a widow and three children, one of whom, Dr. D. Miles Wingate, is practicing dentistry at Great Bend, Pa.

### DR. ARCHIBALD BERRY.

DIED, at Boston, Mass., October 2, 1889, ARCHIBALD BERRY, D.D.S., of Cincinnati, Ohio, in the seventy-ninth year of his age.

We have no knowledge of the birthplace or early life of Dr. Berry, but learn that he was a student in Amherst College, Mass., and one of the first graduates of the Ohio Dental College, which he aided in establishing as one of the original stockholders, and also as an active member of the College Association. While in practice at Raymond, Miss., he was one of the initial members of "A Convention of Professional Dentists" which in August, 1844, at Cincinnati, organized the Mississippi Valley Association of Dental Surgeons, and was, we believe, present at every subsequent meeting of that association. He was also a member of the American Dental Association, Ohio State Dental Society, Mad River Valley Society, and of the Cincinnati Dental Society. His membership in all these organizations was an active one, and his suggestions at their meetings were singularly terse and practical. He was a contributor to the DENTAL COSMOS and to other dental journals. He was prominent in local societies for the promotion of health, temperance, and religion. At a recent meeting of the dentists of Cincinnati highly commendatory resolutions were passed and remarks made in his honor.

### DR. J. L. BAKER.

DIED, at West Chester, Pa., November 18, 1889, J. L. BAKER, D.D.S., in the forty-seventh year of his age.

Dr. Baker was a native of Chester county, Pa., and a graduate of the Philadelphia Dental College, of the class of 1866. For a time he was demonstrator of operative dentistry in the dental department of the University of Pennsylvania. He was proficient in his profession, and was highly esteemed for his kindly disposition and amiable manners. He died from suicide while temporarily insane from insomnia. He leaves a widow.

## PUBLISHER'S NOTICE.

## THE DENTAL COSMOS FOR 1890.

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## PERISCOPE.

**DENTAL EDUCATION IN AUSTRALIA.**—Pursuant to call, a meeting of between sixty and seventy dentists was held at Melbourne, August 7. Dr. Springthorpe opened the proceedings by reading a synopsis of the business to be transacted. He said they had assembled to consider the best means of providing facilities for the education of future dental students, who will have to pass through a prescribed educational curriculum approved of by the Governor-in-Council in accordance with the provisions of the Dentists' Act, 1887. He would urge upon those present the necessity for taking action in the present movement. In order to maintain the dignity of the dental profession, it was necessary that proper teaching should be provided, and he thought the early establishment of a dental hospital would be a step that would suggest itself to the common sense of the meeting.

Mr. Iliffe said that, previous to putting his resolution before the meeting, he would like to allude to the fine attendance of the "craft," all of whom seemed to evince great interest in the proceedings, and desirous of keeping up the status of the profession. Up to the present time, if any young man desired to attain to the fullest knowledge of his profession, he had to undergo the time, trouble, and expense of traveling to England or America to attend a school of dentistry in order to secure a diploma. He thought that it was high time they had educational facilities in the colony of Victoria, and he therefore moved "That this meeting affirms the necessity of organizing a practical scheme of dental education, whereby any dental student, articulated pupil, or apprentice, so enrolled, articulated, or indentured, after the 10th of May, 1889, may obtain educational facilities which shall enable him to qualify himself in due course for examination and subsequent registration, in pursuance of the regulations of the Dentists' Act, 1887, relating to the future registration of dentists; and, further, this meeting pledges itself to support such scheme by individual donations and annual subscriptions."

Dr. Cheetham thought it was unnecessary to establish a separate school, and he maintained that the Dental College should not be divorced from the University. And before rushing into a scheme, he thought it would be better to calculate the cost of the establishment of a college. It would, in his opinion, have to be conducted on the lines of the Medical School, and (he spoke as an old tutor) there would be great difficulty in securing efficient teachers. He believed that there were eighty to a hundred pupils ready to commence the study of dentistry, and he thought that the students could get the necessary instruction at the University and hospitals.

The chairman answered that it was quite evident Dr. Cheetham had not seen the curriculum framed by the Dental Board. It was specified that the subjects—chemistry, materia medica, botany, and anatomy—as taught at the University and the College of Pharmacy would be recognized by the Dental Board, but he desired to point out that very meager instruction could be got from the hospitals in dental work. It was for sound practical work that the school was to be established.



Mr. Carter thought they would have to make a modest beginning, establish a small hospital, and pay for the teaching staff by individual donations.

The chairman concurred with Mr. Carter, and cited as an example the Eye and Ear Hospital, which, he said, started with two rooms in the house of a Melbourne medical man.

Mr. L. J. Blitz at this stage said that, if it were a matter of indifference where they established a college, he would be pleased to present a plot of ground and the two-story building thereon situated in Ryrie-parade, Clifton Hill, to be used as a dental hospital.

The motion was then put to the meeting, and carried unanimously.

Mr. Potts said that he had been requested to bring before the meeting a scheme for the formation of a Dental Association of Australasia. There were four hundred and eighty-six registered dentists in the colony and he believed that they could be induced to form an association which would provide for the education of future dental students, and also to support and protect the character, status, and interests of registered dentists; to consider, originate, and promote improvements in the law relating to dentists, and to advance and encourage the study of dentistry and allied subjects by the establishment and maintenance of a dental college, a hospital, a library, a museum, and the publication of a dental journal.—*Australasian Journal of Pharmacy*.

**DENTAL EDUCATION IN GREAT BRITAIN**—By the Dentists' Act of 1878 it is held that only those persons who are registered as "dental practitioners" can call themselves "dental surgeon" (or an equivalent title), and recover fees for dental operations. There are three sets of persons who can or could be registered, viz: (1) those who are licentiates in dentistry of any of the medical authorities; (2) those who hold certain foreign or colonial diplomas as dentists; and (3) those who at the passing of the act were *bonâ fide* engaged in the practice of dentistry, either separately or in conjunction with the practice of medicine, surgery, or pharmacy. So far the only registrable foreign qualifications are Doctor of Dental Medicine of the University of Harvard, and Doctor of Dental Surgery of the University of Michigan. Persons, such as chemists and druggists, who were in practice as dentists before the passing of the act, had the privilege of being registered on payment of a fee, but this privilege ceased early in 1880. Since then those who have been registered have had to be licentiates. This is the position at the present time; consequently this article will be directed to show how to become a dental practitioner.

The licensing bodies in this country are the Royal College of Surgeons, England; the Royal College of Surgeons, Edinburgh; the Royal College of Surgeons, Ireland; and the Faculty of Physicians and Surgeons, Glasgow. As the administration of the act rests with the General Medical Council, that body regulates the conditions of study and license, and has decreed that before commencing his professional education the dental student must pass a preliminary examination in arts. The examination is identical with that required of medical students, and the exemptions are also the same, except that in this instance those who had commenced their dental

education before July 22, 1878, are not required to pass a preliminary examination. Having fulfilled this initiatory requirement, the student should, on entering upon his medical studies, apply to the registrar of the General Medical Council to be registered as a dental student. His professional education consists of: (1) apprenticeship, or instruction in mechanical dentistry, for a period of not less than three years; (2) attendance on lectures, etc., at a general hospital and medical school for one summer and two winter sessions—eighteen months; and (3) attendance at a dental hospital and school for two years.

The attendance at the general medical and at the special dental hospital and school may be carried out simultaneously and completed in two years. This plan of work really takes up the whole of the student's time, and it is impossible for him to concurrently engage in any mechanical or other employment. The following is an estimate by one who has gone through the mill of the cost of the curriculum in London, apart from the cost of living: Pupil's premium, £63; General Hospital fees, £42; Dental Hospital fees, £25 10s.; dental instruments, £25; books, £10; parts for dissection, £2; subscriptions, £2; registration fees, £5; examination fees, £10 10s.; total, £185. The nature of the studies during the two years' curriculum is determined by the subjects of the qualifying examinations.

*Where to obtain Dental Education.—London.*—Dental Hospital, Leicester Square, W. Sessions commence October 1 and May, 1890. Fees for special lectures and hospital practice, £31 10s. Dean, Mr. Morton Smale, M.R.C.S.

National Dental Hospital and College, 149 Great Portland street, W. Sessions as above. Fees for dental lectures and hospital practice, £25 4s. Dean, Mr. F. Henri Weiss.

Guy's Hospital (Dental School). Fees, dental subjects and practice only, £31 10s.; complete instruction, £70 in one sum. Dean, Dr. Perry.

The following are the fees for general subjects and hospital practice at the undermentioned schools:

Charing Cross Hospital, £42 2s.; London Hospital, £42; Middlesex Hospital, £42; St. Bartholomew's Hospital, £66 3s.; St. George's Hospital, £55; St. Mary's Hospital, £24 (hospital practice only); St. Thomas's Hospital, £55; University College, £63; Westminster Hospital, £52 10s.

*Provinces.*—Birmingham, School of Dentistry, Queen's College. Fees: £63 for the full curriculum. Hon. Secretary, Mr. J. Humphreys, L.D.S., 21 Newhall Road, Birmingham.

Dublin, Dental Hospital, 25 Lincoln Place. Fees and curriculum are the same as exist at the London Dental Hospital. Dean, Dr. R. T. Stack, F.R.C.S., etc.

Edinburgh, Dental Hospital and School, 5 Lauriston Lane. Fees: hospital practice and special classes, £25 10s.; for *all* subjects and examination fees for L.D.S. Edin., £75 12s. Dean, Mr. Bowman Macleod, L.D.S.

Exeter, Dental Hospital, Castle street. Fee: £5 5s., for hospital practice only.

Glasgow, Dental Hospital and School, 4 Chatham Place, Stirling Road. Fees: hospital practice and special lectures, £25 4s. Secretary, Mr. D. M. Alexander, 117 Wellington street, Glasgow.

Liverpool, University College and Dental Hospital, Mount Pleasant. Fees: for everything, £73 10s. Hon. Secretary, Mr. W. L. Jackson, Central Buildings, North John street.

Manchester, Owens College, and the Victoria Dental Hospital, Grosvenor street, All Saints. Fees: for everything, £73 2s. Dean of the Hospital, Mr. H. Planck, L.D.S.I.

Plymouth, Dental Hospital, Octagon. Fees: for special lectures and dental practice only, £23 2s. Secretary, Mr. E. G. Bennett.—*The Chemist and Druggist.*

## HINTS AND QUERIES.

**TRIAL TEETH.**—The difficulties encountered in getting what is commonly called an articulation or bite as a guide to the proper arrangement of artificial teeth upon a trial plate have led me to devise what may be termed trial teeth.

They were in fact invented and would doubtless be considered patentable, but it is questionable if the probable demand for them would justify any manufacturer in making the large number of special molds which are required for putting new forms of artificial teeth on the market, and I therefore adapt my invention to forms such as dentists can readily obtain and in their own laboratories fix upon bases in the form and manner which I will now describe.

Take some No. 29 or 30 tinned copper or sheet brass and cut into suitable strips shaped like A, Fig. 1. Select any shade of countersunk teeth, No. 8 or 12 mold, as Fig. 2, and bend a strip to fit each of them and also to conform to the general cross-shape, as B, Fig. 1, of the edentulous ridge of that part of the jaw on which the particular tooth is to rest. Take a cork and cut in its end a recess or socket in which the countersunk lateral will be held as shown in Fig. 3. Have



ready a small hot soldering iron, touch the tooth-pin with a stick dipped in a solution of chloride of zinc (a little of the fluid for oxychloride cement poured upon the mixing slab will serve the purpose), fill the countersink in the tooth with tin solder from the point of the iron, touch the tinned surface of the bent strips with the chloride of zinc stick, place the strip on the tooth and press it down with the hot iron. Hold the strip in place while the iron is being removed, to let the solder stiffen. The result will be a trial tooth like Fig. 4, a cross-section of which is shown in Fig. 5.

When the other lateral has been likewise soldered to its base, the cavity in the cork is enlarged to receive the central, and the like method pursued until all the teeth have been soldered to their bases, the molars appearing as shown by Fig. 6. As each tooth becomes cool, its base should be pulled with pliers to be sure that it is soldered fast to the tooth. The free ends of the bases may be bent more or less to adapt them for use. Although it is desirable to have several sets of varying widths and lengths of the trial teeth, two sets of the numbers specified will very well serve, because their length can be practically increased by layers of wax underneath them. For lower teeth Nos. 4 and 6, Fig. 7, are preferable.



The old style pivot teeth may be used by hard soldering short pins of brass wire No. 15 or 16 to the base-strips, and then mounting the teeth on the pins with melted sulphur. In fact, almost any of the plain teeth may be soldered or otherwise fixed upon such individual bases to serve as trial teeth for either partial or full dentures.

When the trial plate is ready for, say, a full upper denture, the two trial centrals are to be waxed on the plate and tried in the mouth. It will be found that the base-strips afford so firm a support that the trial teeth can be placed exactly as it is desired the permanent teeth shall be set in relation to the lower

FIG. 3.

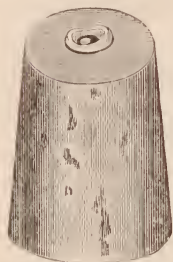


FIG. 4.



FIG. 5.



FIG. 6.



FIG. 7.



teeth, Fig. 8. The laterals, cuspids, etc., are then adjusted and articulated with ease and certainty. It is obvious that by these means the length, fullness, articulation, and all the other adjustments requisite for the appearance, contour, and usefulness of the designed denture can be more exactly and certainly secured than by the means commonly employed for this purpose. Fig. 9 shows a full upper denture thus arranged.

When the trial teeth have been satisfactorily fixed upon the plate and the lips of the bases covered with wax to hold the teeth very firmly in place, the plate is to be held for a few minutes in cold water, then replaced in the mouth, a narrow roll of quite warm impression-wax laid upon the lower teeth, and the bite quickly

FIG. 8.



FIG. 9.



and carefully taken, keeping in view the labial and buccal surfaces of all the trial teeth to be sure that they do not get displaced by the bite.

After obtaining the articulating models in the usual way and carefully removing the impression-wax, the trial plate and teeth will be found to be incomparable as guides for the selection, arrangement, and articulation of the permanent teeth.

By arranging these upon a base-plate which can be removed from the cast to permit the trial plate to be from time to time substituted, a perfect correspondence of the two plates may be obtained, and, by due provision and allowance for the thickness of the parting line of the vulcanizing flask, a perfect practical repro-

duction of the trial plate will result, and the completed denture be in every respect just what was accomplished with the trial plate. The new method may therefore be confidently relied upon as precluding the usual necessity for trying in the permanent teeth in order to correct the common errors attending the taking of a wax-modeled bite.

The trial teeth are especially useful in obtaining correct bites for partial plates, because they aid in determining the precise lengths and sizes of the teeth to be selected for the case.

The free portions of the bases may be perforated with the plate-punch if desired ; and such bases made of platinum or platinum and iridium plate and soldered to the permanent teeth with pure tin would make strong mountings in vulcanite or celluloid for special partial or full cases.

The certainty of the results, the time saved for both dentist and patient, and the esthetic possibilities of the method more than compensate for the cost and trouble of preparing for constant use a variety of shapes and sizes of the trial teeth herein presented to the profession.—W. M. HUNT, D.D.S., Peru, Ill.

**CEDAR-WOOD CANAL-POINTS.**—Referring to the report in the *DENTAL COSMOS* for October of the last meeting of the American Dental Association, I wish to call attention to a material for root-filling that seems to me far superior to anything mentioned by those who took part in the discussion of that subject. The material is red cedar *properly and thoroughly prepared*.

Having split red cedar into small pieces the size of an ordinary match or even smaller, place them in paraffine, heated almost to the boiling-point. Allow them to fry in this material till all the moisture is expelled and the wax thoroughly permeates the wood. Allow the paraffine to cool, then again raise the temperature sufficiently high to scorch the wood a *very little*. Cool again, then re-heat. The heating and cooling allows the paraffine to thoroughly fill the pores of the wood. My reasons for preferring this material are that the red cedar is almost indestructible, and though a very dense wood it is also very soft, and when driven into the tooth will adapt itself to the form of the canal. The paraffine renders it impervious to moisture and makes it easy of removal if desired. As a disinfectant and antiseptic I apply chloride of zinc to the walls of the canal previous to insertion of the paraffined cedar.—JAMES H. BEEBEE, Rochester, N. Y.

**THE V-SPACE.**—In reading the reports of dental societies published in the *DENTAL COSMOS*, I have observed for a long time past that Dr. Clowes stands almost if not quite alone as an advocate for the V-space as a preventive of the recurrence of decay after filling. It seems impossible that a dentist of his experience should so persistently advocate this system unless he is thoroughly satisfied with its good results, and to be satisfied with the results of any dental operation after years of experience proves its value.

I have often thought that the V-space receives but scant justice at the hands of the contourists. It is always allowed on the one hand that only perfect contour operations will preserve the teeth, while on the other any failure due to an imperfectly cut space is held up as a reason for its discontinuance. Surely there are many failures due to imperfect restoration of contour, and these instead of being passed over should be placed in the scale in striking a balance. I have made spaces in several ways and have found defects in most of them. I believe, however, that it is possible to remedy these defects and to finally produce a positive and best method of spacing, just as, thanks mainly to the late Dr. Webb, we have now a perfect system of contouring. I have seen so many teeth preserved by

imperfectly cut spaces that I feel convinced that it only needs some improvement on the present generally adopted methods for this system to run the "perfect contour" a hard race for supremacy.

In making the space, I formerly beveled the teeth from the crowns to the gum, and also beveled largely toward the lingual and slightly to the buccal surfaces. This I found gave a projection at the gum which was more or less a point, or rather a line, of contact, depending on the extent of the decay. Even when the decay extended below the gum and consequently a distinct space was left bare after filling, it was found that in many cases the moving together of the teeth produced contact at this point. The teeth then touched or nearly touched as in Fig. 1. The beveling from the crown caused the food to be sometimes driven through the point of contact, and the shape of the teeth so favored its retention that decay took place below the gum. I then cut the space from the lingual to the buccal surface, leaving the teeth in contact only at this latter part. In certain

FIG. 1.



FIG. 2.



FIG. 3.



cases decay recurred where the buccal walls were in contact. I now, with a view to remedying these defects, cut a narrow parallel space between the teeth, and then from the corner of this space bevel equally outward and inward (Fig. 2). The crowns of the teeth viewed from the masticating surfaces present the appearance as in Fig. 3.

Should the teeth move together, the contact will not favor the driving of food against the gum and its retention there. Should they remain apart, they can be readily kept clean, and in either case the outward and inward bevel enables a tooth-brush to be effectively used. Capillary attraction is also greatly overcome. I have not practiced this method sufficiently long to be sure of the results, and merely give it as a method which may or may not be a step in advance. Whether it is practiced by others or not I do not know. There is, I think, a distinct need for more light on this subject, and it would I think be extremely useful to his younger brethren if Dr. Clowes would kindly give us his method of "spacing," illustrated, if possible, by diagrams.—W. C. GRAYSTON, Scarborough, Eng.

**GOLD TIPS.**—In making tips for abraded teeth, to lengthen them, or to avoid pulp-exposure by abrasion, the method I have used for years is to take pure rolled gold, about 480 foil; cut a piece a little larger than the face of the tooth to be tipped; place it on the tooth with a piece of erasing rubber over it; let the patient bite hard on the rubber; anneal the gold and repeat the bite. In very uneven surfaces I sometimes have to use a small piece of elastic rubber underneath the erasing rubber. This gives a perfect swage. Cut a piece of solder (20-k) the size of the swaged gold; lay it on a strip of the gold you use for your tip; lay the swaged gold on the solder and fuse the solder. If proper care has been used, you will have a perfect-fitting tip. Drill two or three holes through the tip in positions to pass between the pulp and periphery of the tooth on a line with the axis; in these holes put platinum pins and solder. Trim as near as may



be to the form you wish it when finished. Cement to the tooth, burnishing the edges well, then grinding and polishing to the finish. Any thickness can be built up that is desired.

With proper care you will have a substantial tip that will last many years. I put one on in 1871 that the patient wore until he died this summer. Many others since have proved equally satisfactory. Years ago I used thin platinum instead of gold, but I discarded it on account of the color.—W. H. JACKSON, D.D.S., Ann Arbor, Mich

**A CURIOUS CASE.**—The patient, an elderly gentleman in active life,—a druggist,—wished me to extract the lower right third molar, which had been loose and troublesome during the past year, and, though not carious, was very dark in color, verging upon black at the partially exposed roots. The tooth had antagonists in the upper jaw, and they increased his discomfort by their occlusion. Of the second molar nothing remained but its roots. From the tumefied gums around the third molar there was a slight discharge of pus, such as is observable in cases of Rigg's disease. I extracted the tooth, which surprised me by the great resistance it offered, and by the suddenness of its release, accompanied with a sound like the "pop" of a cork from a bottle.

The patient complained of great pain, but left the office upon my assuring him that it would soon subside. The black and foul-smelling roots of the tooth were slightly enlarged at the ends, which accounted for the difficulty attending the extraction, but aside from those abnormal appearances there was no reason for an anticipation of what followed.

In about an hour the patient returned and exhibited a swelling in his neck, and a white, apparently fibrous, mass protruding from the socket of the extracted tooth. The case was such a remarkably curious one that I called in a surgeon, whose office is in the same building with my own, and he was free to admit that he had never seen such a case, and was at a loss to suggest an explanation. The mass more than filled the socket, and could be pressed deep down into the cavity without occasioning pain or the discharge of blood or pus.

I tentatively applied a cocaine lotion to the parts, and the patient departed free from pain. After several days it was found that the swelling and the intruder had disappeared as suddenly and surprisingly as they had appeared, the parts had begun to heal, and recovery was rapid, painless, and complete.

My consulting friend as physician and surgeon, and for a short time as dentist also, had an experience which enabled him, in agreement with myself, to discriminate the strange intruding mass from the ordinary sac of an alveolar abscess left behind when the tooth was extracted, and in our joint discussions of the case since that time we have been unable to formulate an explanation in anywise satisfactory. Possibly some of the *Cosmos* readers can throw light on the subject.—GRAFTON MUNROE, A M., D D.S., Springfield, Ill.

**ILLEGAL DENTAL PRACTICE.**—We have received a copy of a circular signed by Drs. G. E. Douglas, J. W. Funck, and H. T. King, a committee of the Nebraska State Dental Society, from which we make the following extract.—**ED. DENTAL COSMOS.**

"In July last, Geo. W. Schwartz was indicted for practicing dentistry in Nebraska City, Nebraska, in violation of State law. The committee of the State Dental Society did not commence the case, but finding it had been commenced, took charge of the prosecution. The case came to trial September 28, the defense being that Schwartz was a graduate of medicine and qualified by his diploma to

practice dentistry. The court, however, held *that a physician's diploma did not authorize him to practice dentistry or dental surgery*. The defense further offered to prove that the defendant was a skilled workman in dentistry, that he operated in a manner that gave satisfaction to his patients, and that he did good work as a dentist. *All of which was ruled out by the court.*

"In spite of the fact that the rulings of the court excluded every particle of defense offered by the defendant, and that the instructions of the court were against the defendant, the jury after being out eighteen hours returned a verdict of not guilty. What the court thought of the verdict is shown by the unmerciful scoring Judge Field gave the jury in discharging them at the close of term. Among other things, he said, 'Gentlemen, I cannot refrain from saying something at this time. There have been four criminal cases of importance before this court during the term. The first was that of the dentist Schwartz, who admitted a violation of the law; yet the jury acquitted him,' etc."

A NARROW ESCAPE.—Two weeks ago Miss H—— broke a partial set of upper teeth that she had worn for years, and came to my office to have the remaining teeth extracted for a full set, stating that she wished an anesthetic, as she was extremely nervous and feared she could not endure the operation without it. I advised her to have the plate repaired and to retain the natural teeth, which could be made serviceable for years. To this she finally consented, and left the plate for repairs, promising to call for it the next morning. She never came, however, for that very night she was stricken with paralysis, and still lies at the point of death. Had I granted her request and administered an anesthetic, the shock that so soon followed would certainly have been attributed to that as the cause.—W. H. COLGROVE, D.D.S., Johnstown, N. Y.

TO THE EDITOR OF THE DENTAL COSMOS:

Dear Sir,—If American dentistry is to maintain its world-wide reputation, it would seem that there should be more general dental education and more effective dental legislation. While dentists in the United States have within easy reach every facility for the attainment of professional excellence, their status is as low in some sections as it is high in others. The writer, in recently revisiting the scenes of his boyhood in Middle and Southern Tennessee, was both surprised and pained to learn by personal observation of the character of much of the dental practice there. Patients are taught that teeth which ache should be removed; and where a carious cavity of any considerable size is found, the advice is, have the tooth extracted to prevent it from aching. Worse than this, the mere suspicion that a tooth is defective justifies its extraction. Girls not yet arrived at maturity wear full sets of artificial teeth, conspicuously unnatural in appearance and so ill-fitting as to be in no way a comfort to the wearer. Deciduous teeth receive no professional attention except extraction. These facts are stated with all due respect for the sincerity of those to whom reference is made, and without thought of anything personal or even sectional; but they so impressed the writer that he feels constrained to call attention to them in the hope of stimulating efforts already in progress toward the enlightenment and better education not only of dentists, but of the public, not only in the section alluded to, but wherever the DENTAL COSMOS circulates. If space permitted, he would be glad to record many noteworthy evidences of professional proficiency observed in various parts of the United States, and to make mention of the never-to-be-forgotten appreciation of cordial welcome and professional courtesies during his visit.—CHAS. KEYES, D.D.S., Rio de Janeiro, Brazil.

# A MONTHLY BIBLIOGRAPHY OF DENTAL LITERATURE.

COMPILED BY J. MELVIN LAMB, M.D., D.D.S., WASHINGTON, D. C.

THIS bibliography will be continued monthly in the DENTAL COSMOS, and will furnish as complete a record of dental literature as can be gleaned from current periodicals and transactions of societies.

The abbreviations of titles used are those common to bibliographical work, and will, it is presumed, be readily comprehended by any one familiar with dental or scientific publications. Any explanation will be gladly furnished by the compiler.

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